SOUTHERN POWER AND INDUSTRY

JUNE, 1955

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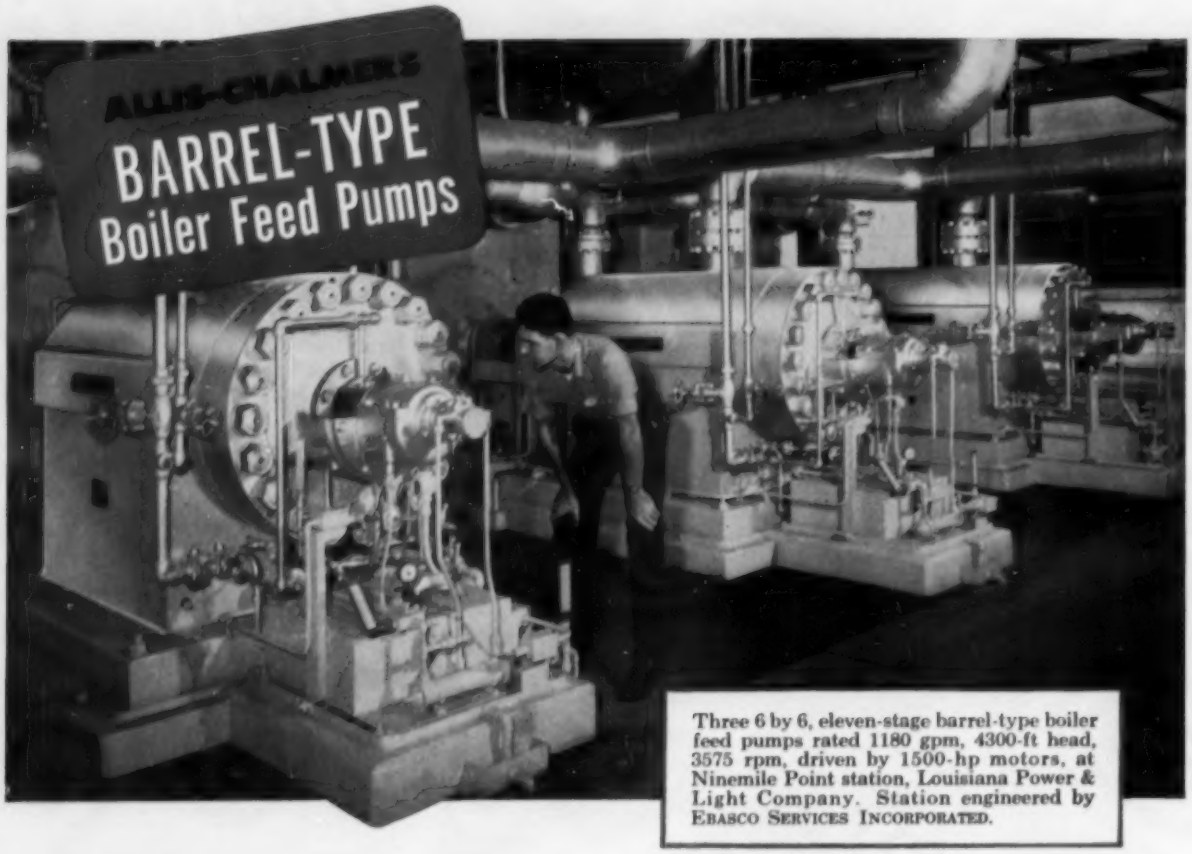
VIRGINIA CHEMICAL PLANT MAKES PLASKON NYLON

Phenol arrives at Hopewell, Virginia from Barrett Division's Frankford, Pa. plant. At the Hopewell monomer plant, phenol is combined with synthesis gas and ammonia supplied by Allied's adjacent Nitrogen Division plant to form caprolactam. This material is then carried by truck to National Aniline's new polymer plant in Chesterfield, Virginia. Here, it is made into Plaskon Nylon 8200, which is marketed by Barrett Division. (See page 10)



Three 6 by 6, eleven-stage barrel-type boiler feed pumps rated 1180 gpm, 4300-ft head, 3575 rpm, driven by 1500-hp motors, at Ninemile Point station, Louisiana Power & Light Company. Station engineered by EBASCO SERVICES INCORPORATED.

First Choice with Louisiana Power & Light Company

A proved service record the country over . . . simple, low maintenance design . . . high efficiency performance — these were some of the factors that led Louisiana Power & Light Company to choose Allis-Chalmers barrel-type boiler feed pumps for their Ninemile Point station.

Features Keep Operating Costs Low

First stage has twin, single-suction impellers to give low NPSH requirement for highest efficiency under fluctuating loads. Impellers, mounted back to back, balance axial forces without use of balancing drum. Double volute casing maintains radial balance under fluctuating load. Expansion joint and shaft seals are brought to outside of pump where they may be inspected often and worked on easily, if required.

Complete Unit From One Source

Allis-Chalmers can supply the complete pumping unit — pump, motor and control — of coordinated design and manufacture. You get one responsibility — one guarantee of satisfaction.

Get complete information on Allis-Chalmers barrel-type boiler feed pumps. Call your Allis-Chalmers District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B7899.

A-4635

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Volume 73 Number 6

Here's still another...

...new Municipal Power Plant using **CLARAGE** Fans!

● Serving the City of Owensboro, Kentucky, is this new addition to its power plant on the Ohio River.

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Power plant people know that Clarage mechanical draft equipment on the job means satisfaction with the job. And this point has been PROVED in countless installations where Clarage fans have been giving economical, uninterrupted service for 30 years and longer. **CLARAGE FAN COMPANY, Kalamazoo, Michigan.**

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"WE ENJOY REAL FUEL ECONOMY WITH TEXACO URSA OIL"

Elmer Leckrone, Plant Superintendent, Northwestern Public Service Company, Yankton, South Dakota

POWER PLANT of Northwestern Public Service Co., Yankton, S. D., has used *Texaco Ursa Oils* for 20 years. Fairbanks-Morse engines in service include three Model 33 slow-speed diesels, one Model 38 OP high-speed diesel, and one Model 31 AD 18 dual-fuel unit.

Northwestern Public Service Company's Yankton, S. D., plant operates both straight diesel and dual-fuel engines—all of them lubricated with *Texaco Ursa Oil*. Mr. Elmer Leckrone, Plant Superintendent, says:

"Never, in more than 20 years, has *Texaco Ursa Oil* 'let us down.' Our engines stay clean, wear is negligible, and we enjoy real fuel economy."

This experience is typical. *Texaco Ursa Oil* does a great job of keeping engines clean. It stands up under heat and pressure...stands off oxidation and sludging...keeps rings free for proper compression and combustion. This means you'll use less fuel...spend less for maintenance.

There is a complete line of *Texaco Ursa Oils* to give your diesel, gas or dual-fuel engines the best "run" for your money. Leading engine builders O.K. them; operators everywhere use them. In fact—

For over 20 years, more stationary diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.

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SOUTHERN POWER AND INDUSTRY

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No. 6

JUNE
1955

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

June, 1955

► HOW A NEW TEXAS FACTORY SWALLOWED THE OLD without production interruptions is described in this issue of SP&I. It was one of the biggest and most unusual projects in the 42 year history of The Double Seal Ring Co.

Built during World War I, the main building of the Fort Worth, Texas, piston ring manufacturer had grown dilapidated. They could not build a new plant on a new site without stopping production and income. The cost of replacing office buildings, stock houses, etc., that were still entirely satisfactory, would have been high. After considering several types of buildings, Double Seal engineers purchased a prefabricated rigid frame building (Metallic Building Company of Houston, Texas), wider, taller, and longer than the old one--and set it right over the top. Illustrated construction and erection details are featured in this issue.

► THREE MILES OF RUBBER CONVEYOR BELTS, operating in four directions at once, keep 1,400 tons of coal an hour flowing into the country's largest electric power producing steam plant near Paducah, Kentucky. Manufactured and installed by the B. F. Goodrich Company, elevated sections of the belt speed overland on towers raised as high as 50 ft above the ground. The belts go up steep grades, span a river channel and road, probe underground for short runs to reach a 1,450,000 ton stockpiling area.

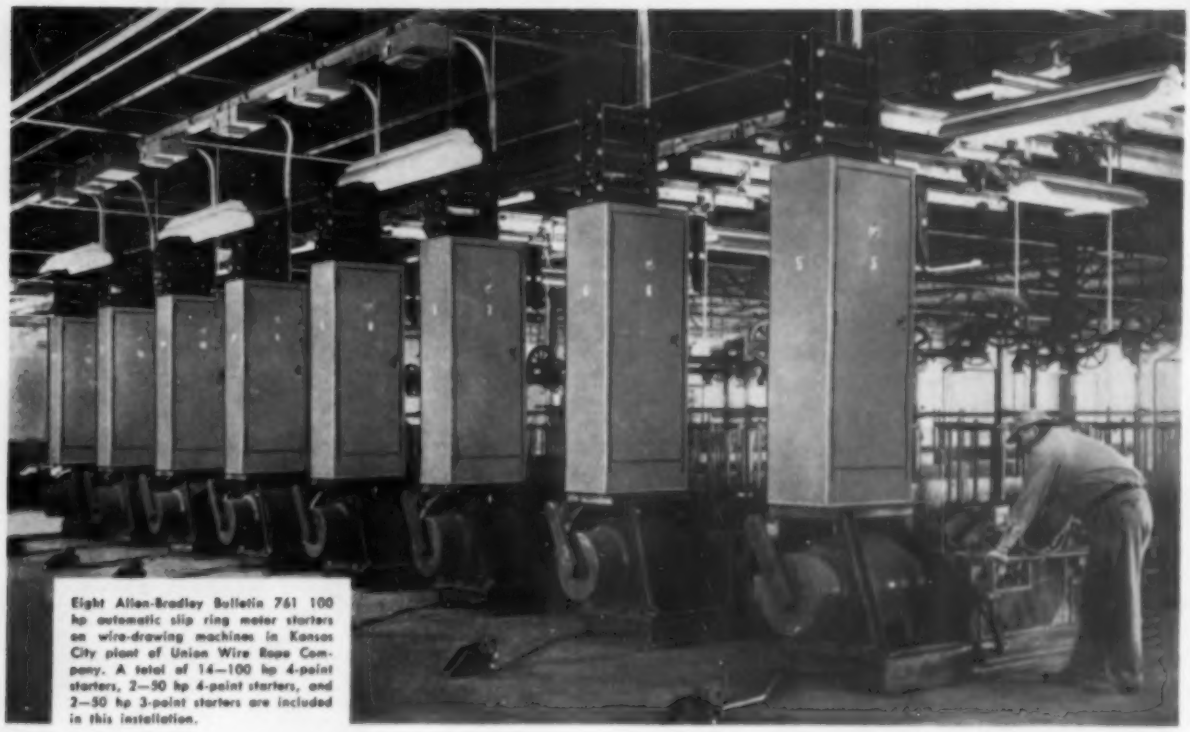
The multiple belt-road delivers 14,000 tons of fuel a day for the ten 150,000 kw generating units at the new Tennessee Valley Authority Shawnee plant at Chiles, Kentucky. Power produced at the Shawnee plant is fed to the gaseous diffusion plant operated by the A.E.C. at Paducah. In partial operation since early 1953, the Shawnee plant will go into full operation late in 1955 when all of its generating units will be producing for the first time.

► A $5,000 GREASE JOB was recently completed at Dow Chemical's Freeport, Texas, plant. Some 26,900 ball and roller bearings were relubricated, one after the other, with a silicone grease selling at over $6 a pound.

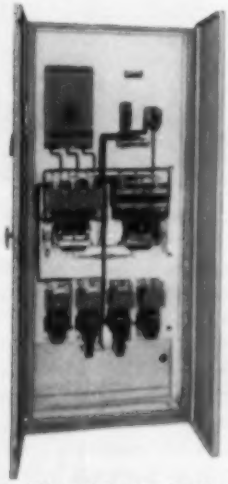
The bearings support long lines of rollers on which newly filled drums of solid caustic soda are racked for a cooling-off period. Drums are filled with molten caustic at a temperature of about 698 F and conveyed to the racks immediately. For 16 hours they stand, radiating heat, until they have cooled sufficiently for handling. Heat given off by the loaded drums would tend to break down any conventional bearing lubricant in short order. Before long a bearing would freeze and a roller would jam.

To assure adequate lubrication without a speck of waste, a "metered" gun was used. Exactly half an ounce was measured out per bearing. Even so, the job required over 840 lb of grease. It was the first time any one of these bearings has ever been relubricated, despite constant exposure to extreme temperatures and corrosive atmospheres, since their installation almost five years ago.

(Continued on page 6)



Eight Allen-Bradley Bulletin 761 100 hp automatic slip ring motor starters on wire-drawing machines in Kansas City plant of Union Wire Rope Company. A total of 14—100 hp 4-point starters, 2—50 hp 4-point starters, and 2—50 hp 3-point starters are included in this installation.



Bulletin 761 special automatic slip ring motor starter with cabinet open to show contactors, starters, and timing relays.

100 HP Solenoid Operated

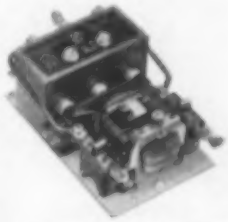
SLIP RING MOTOR STARTERS

provide trouble free control for wire-drawing machines

The accelerating contactors and the magnetic switches in these Allen-Bradley Bulletin 761 slip ring motor starters are simple, solenoid operated units. There is only one moving part . . . the one-piece solenoid plunger with double break, silver alloy contacts. Such simplicity assures long, trouble free life. The silver alloy contacts require no maintenance.

In this installation the grid type accelerating resistors are mounted above the starter cabinets. Timing relays on starter panel govern rate of acceleration. The operator merely pushes the START button . . . and the Bulletin 761 starter goes through the complete starting cycle automatically. When you have a tough control problem, consult Allen-Bradley.

Allen-Bradley Co.
1328 S. Second St., Milwaukee 4, Wis.
In Canada
Allen-Bradley Canada Ltd., Galt, Ont.



Basic unit is the A-B solenoid starter with overload relays.

ALLEN-BRADLEY SOLENOID MOTOR CONTROL

CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

ALBUQUERQUE—A & A Supply Co., 114 Morningside Dr., N. E., Tel: 5-5506
ATLANTA—W. R. Calvariey, 1000 Peachtree St., N. E., P. O. Box 7086, Sta. C., Tel: Elgin 8833
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Facts and trends (*continued from page 4*)

► ATOMIC POWER COSTS--An interesting development is the almost unbelievable DECREASE IN GENERATING COSTS since the Duquesne plant was first proposed. In the Duquesne plant, the first atomic power plant, the total cost of generating electricity has been estimated to be between 11 and 20 mills a kilowatt-hour.

For the Consolidated Edison atomic power plant in New York, the cost has been chopped to 9 mills per kilowatt-hour and officials expect that advances achieved before the station goes into operation will reduce the cost further to 7.5 mills per kilowatt-hour. At this figure, atomic power will become competitive with power from conventional stations.

► CATALYZED MATERIALS are reported to be rapidly revolutionizing finishing methods and providing completely new protective coatings. The DeVilbiss Company recently developed a catalyst gun, which has enabled paint research chemists to continue experiments with catalyzed materials, eliminating the problem of "pot life."

One of the interesting aspects encountered with some catalyst materials is that, during the chemical reaction, heat which is produced serves to reduce the baking time and temperature cycles. This, according to DeVilbiss engineers, can mean the saving of many millions of dollars annually by elimination of a substantial portion of drying and baking equipment.

► WATER SEPARATOR SNUBBERS recently developed by Burgess Manning Company, Dallas, Texas, simultaneously perform the twin functions of water separation and noise reduction. Device is claimed to effectively extract 100% of water from water-sealed vacuum pump exhausts and simultaneously reduces the noise of the gas discharge to ear-comfort level.

Both water and air enter the side of the separator snubber and are separated centrifugally within the unit. The water-free air is then discharged at the top of the snubber and water leaves the unit at the bottom.

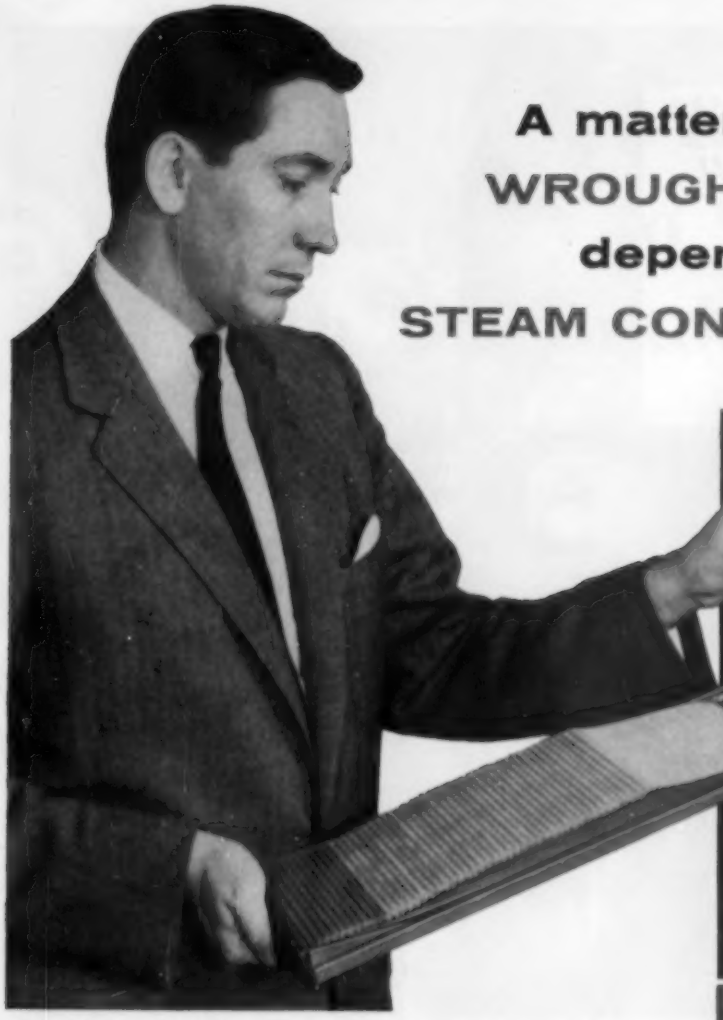
► WATER-COOLED STOKER DESIGN by American Engineering Company is claimed to abolish stack nuisance and to burn the most economical coals with top efficiency. The Vibra-Grate Stoker has its vibrating block-covered water wall connected right into the boiler circulation and provides freedom from smoke, even at low ratings. Dust collectors are eliminated; and the unit permits burning gas or oil in combination with coal, or singly.

► ADDITIONAL HEAT EXCHANGER manufacturing and marketing in the Southwest is underway by the American Locomotive Company, who recently acquired the Carter Craft (Dallas, Texas) fin tube process. This is a method of heliarc welding longitudinal fins to tubes for use in heat exchangers.

Alco has moved the fabricating equipment to its Beaumont, Texas, plant and is establishing a complete manufacturing center for fin tube products. The heat exchanger sections, consisting of a double-pipe arrangement of the company's new finned tubes, are especially built for heavy-duty service where corrosion or contamination is a factor.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

A matter of record...
WROUGHT IRON PIPE
dependability in
STEAM CONDENSATE LINES



There's little doubt about the highly corrosive action of steam condensate on piping material. The big question is, "Which piping material will last the longest?" Our Engineering Service Department knew the answer a long time ago—Wrought Iron Pipe—and have been confirming the fact ever since with detailed service records, kept up-to-date with accurate, regular field reports. Our files are bulging with these case histories—important to you because they provide actual proof of wrought iron pipe's durability and economy in steam condensate line applications.

Some of these case histories are covered in our Special Report—*The Use of Wrought Iron Pipe for Steam Condensate Lines.* You'll find, too, informative material on factors causing corrosion, including the effects of oxygen and carbon dioxide. There is also a section on how to minimize corrosion. We would like you to have a copy. Write for it now.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y.

Available throughout the world.

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CORROSION COSTS YOU MORE THAN WROUGHT IRON

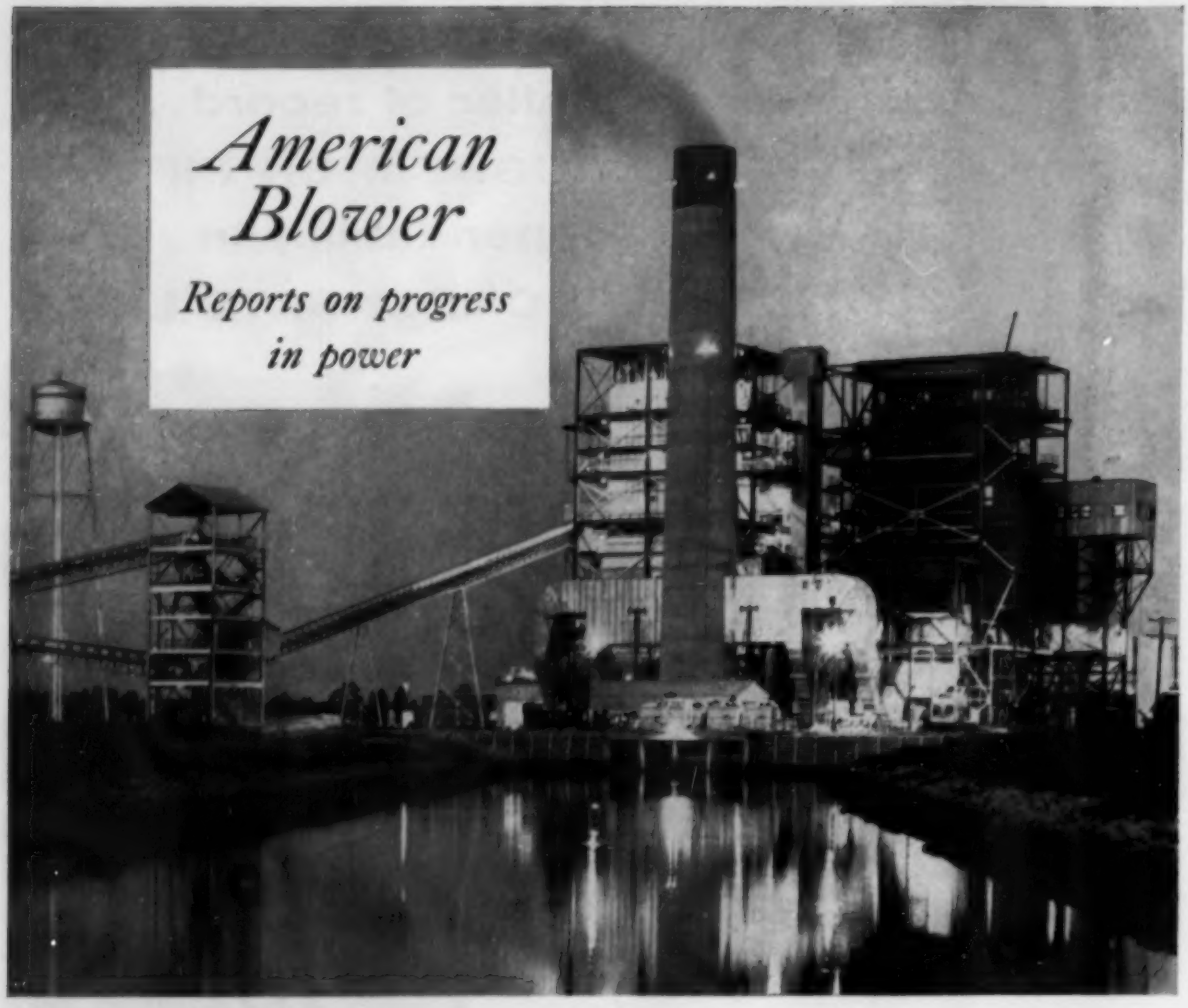
WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

American Blower

Reports on progress in power



CP&L's new plant at Wilmington, N.C., has been named the *Louis V. Sutton Steam Electric Generating Plant* in honor of the company's president. The first mammoth boiler of this outdoor-type unit towers 17 stories high, and produces steam up to 1,000° F with 1,600 lbs. pressure per sq. in. CP&L's system includes three other large fuel-burning plants, plus three large hydroelectric plants.

For new #1 unit of Louis V. Sutton Plant, CP&L installed these two American Blower Sirocco Induced Draft Fans. Each is rated @ 225,000 cfm @ 585 rpm @ 291° F @ 16" sp. If *your* plans call for mechanical draft equipment, fly ash precipitators, heavy-duty steam coils, or fluid drives for boiler feed pump and fan control — contact your American Blower Branch Office, today.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS &

Carolina Power & Light Co. ups capability to 922,000 kw with new outdoor unit

Carolina Power & Light Company's new steam plant reflects design progress, uses American Blower Draft Fans

The new Louis V. Sutton Steam Electric Generating Plant at Wilmington, N.C., is the Carolina Power & Light Company's first plant of outdoor-type construction to be built entirely above ground. No. 1 unit, which went into operation July 1954, adds 105,000 kw to CP&L's generating network, boosting total capability to 922,000 kw!

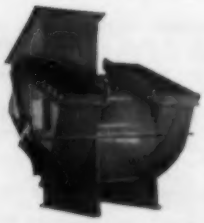
Laid out for a maximum of six generating units, this new plant will be the largest in the company's vast system . . . a system that serves over 2,000,000 people in 30,000 square miles of the Carolinas. Its outdoor design saves on construction costs and time, and reflects CP&L's many years of progress: continually expanding and increasing service to customers.

Along with cost-cutting outdoor construction, CP&L chose efficient and dependable equipment, including American Blower Forced and Induced Draft Fans.

Across our nation, progressive, investor-owned utilities prefer American Blower equipment because it performs at peak efficiency, indoors or out, with minimum maintenance. They know you can rely on American Blower's Forced and Induced Draft Fans, Fly Ash Collectors, Gyrol Fluid Drives for boiler feed pump and fan control, and Heavy-duty Steam Coils.

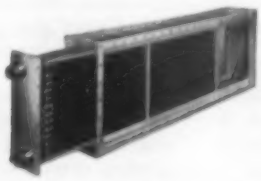
May we assist in *your* progressive program? Give your nearest American Blower Branch Office a call, or write us direct.

This is one of two American Blower Sirocco Forced Draft Fans installed on #1 unit at CP&L's Louis V. Sutton plant. It is rated @ 140,000 cfm @ 585 rpm @ 100° F @ 14.4" sp.

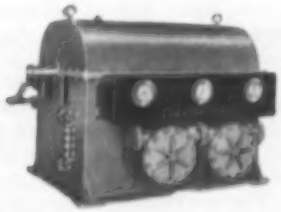


Mechanical Draft Fans for induced and forced draft

Collectors and precipitators for dust and fly ash control



Heavy-duty steam coils for high pressure duty



Gyrol Fluid Drives for boiler feed pump and fan control

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

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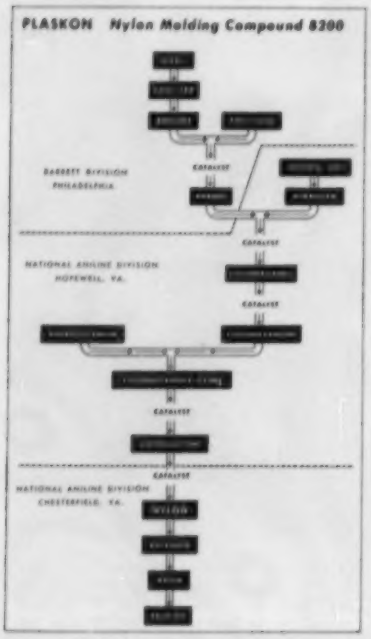
WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

NEWS for the South and Southwest

Virginia Chemical Plant Makes Plaskon Nylon

(See Photograph on Cover)

Large-scale production of a new type of nylon molding compound was announced recently by the BARRETT DIVISION, ALLIED CHEMICAL & DYE CORPORATION. The new nylon com-



pound opens up a wide range of new applications for nylon in industrial and consumer products. As an example, nylon film of extremely high strength and clarity, and also molded bottles of nylon were cited.

Allied Chemical & Dye has made a large investment in production facilities for this new nylon and plans to be an important producer of caprolactam-type nylon.

The new material, known chemically as caprolactam-type nylon, is also called nylon 6. It will be trademarked Plaskon Nylon 8200. It is the product of close cooperation among three divisions of Allied Chemical & Dye—Barrett Division, National Aniline Division, and Nitrogen Division. The Barrett and Nitrogen Divisions supply basic chemicals. National Aniline Division operates the nylon production facilities at HOPEWELL AND CHESTERFIELD, VIRGINIA. Barrett Division then takes over as the selling agent.

The material offers interesting new possibilities to molders and extruders. These include high tensile strength, excellent abrasion resistance, light weight, self-lubricating properties, good resistance to chemicals, high heat resistance, and excellent impact strength and toughness. It is now possible to produce larger parts with thicker sections because of improved moldability. On the basis of available data, Barrett technicians expect that the new nylon will be able to compete economically with less costly materials of lower strength.

Typical applications include gears, bearings, bushings, wire jacketing, and cable coating, valves, instrument housings, and coil forms.

It was also predicted that markets in the aircraft, automotive, electrical, hardware, and appliance fields will expand considerably with the entry of this new compound.

Because the new nylon can be extruded easily and has controllable crystalline structure, it can be formed into a clear film with high strength, toughness, abrasion resistance and heat resistance, it was pointed out by Carleton Ellis, Jr., Director of Sales for the Plaskon Division. In its unoriented state, this film will probably be used as a laminating material, in tapes, and as sheeting for conveyors.

Houston Lighting & Power Co. Re-elects Officers

Confidence in the continued growth of industry, business and population of the Texas Gulf Coast area was the keynote of the annual meeting of stockholders of HOUSTON LIGHTING & POWER COMPANY, held April 20 in the company's Electric Building offices.

The 21 members of the company's board of directors, all of whom are residents of its service area were re-elected to one-year terms. Directors re-elected included president W. A. PARISH and four other members of the company's management staff.

At a meeting of the board of directors which followed the stockholders meeting, all officers of the company were re-elected. These include: W. A. PARISH, President; W. J. AICKLEN, Executive Vice-President in Charge of Operations; T. H. WHARTON, Executive Vice-President in Charge of Finance; F. M. AUSTIN, Vice-President; P. H. ROBINSON, Vice-President; C. B. SHERMAN, Vice-President; J. C. REESE, Comptroller; J. A. BORDELON, Secretary and Treasurer; C. F. ELLISON, JR., Assistant Secretary and Assistant Treasurer; and H. E. GATLIN, Assistant Secretary and Assistant Treasurer.

Speaking before the assembly of stockholders, President Parish cited 1954 as the greatest year of expansion in the company's history. New facilities costing $41,903,584 were installed. Since the end of the year, the company's total investment in electric service facilities has passed the quarter-billion dollar mark, and as of the end of March stood at $251,002,510.

The forecasts of high levels of business, industrial and construction activity during 1955 for the nation as a whole seem particularly applicable to the company's service region, Mr. Parish said. He added that existing backlogs of planned new construction, together with the area's natural advantages and an environment conducive to continued industrial growth and development augur well for its continued progress and prosperity.

FUTURE EVENTS
Of Engineering Interest

AMERICAN WELDING SOCIETY, J. G. Magrath, Sec'y, 33 West 39th St., New York 18, N. Y.
June 7-10, National Spring Meeting, Hotel Muehlebach, Kansas City, Mo.

SOUTHEASTERN ELECTRIC EXCHANGE, J. W. Talley, Mg. Dir., 302 Haas-Howell Bldg., Atlanta 3, Ga.
Aug. 11-12, Personnel Administration Section, Roanoke Hotel, Roanoke, Va.
Sept. 22-23, Engineering & Operating Section, Charlotte Hotel, Charlotte, N. C.
Oct. 27-28, Sales Conference, Biltmore Hotel, Atlanta, Ga.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, E. K. Stevens, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Nov. 14-18, Chicago Exposition of Power & Mechanical Engineering, Chicago Coliseum, Chicago, Ill.

23TH EXPOSITION OF CHEMICAL INDUSTRIES, E. K. Stevens, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Dec. 5-9, Exposition, Commercial Museum and Convention Hall, Philadelphia, Pa.

More News—Page 12

"33,000 HOURS proved the choice was right!"

When a prominent North Carolina community converted its power plant to diesel operation, it called in Sinclair Lubrication Engineer Jim Holt for his recommendations on proper lubricants.

Mr. Holt reports, "I recommended Sinclair RUBILENE®. My previous experience convinced me that this diesel lubricating oil would provide maximum wear protection for this power plant's six 1000 K.W. diesel engines. RUBILENE also guards against sticking rings and prevents excessive wear of cylinders, pistons and other moving parts operating continuously for long periods.

"RUBILENE was the right choice," Mr. Holt continues. "After 33,000 hours of near-continuous operation, bearings show very little discernible wear – and there's not a sign of erosive or corrosive action. *Oil consumption is remarkably low,* considering the prolonged operating hours under overload. All six 1000 K.W. engines, with a total output of 6400 K.W. per hour, *use a total of only 1 barrel of oil a day!*"

Why not give a Sinclair Lubrication Engineer the chance to help solve *your* lubrication problem. *There's no obligation.* Contact your local Sinclair office or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N.Y.

SINCLAIR DIESEL LUBRICANTS

TO BRING more electricity to Wilmington, N. C., from its big, new Louis V. Sutton plant, Carolina Power & Light Company recently laid submarine cables across the Cape Fear River. Here, two tugs buck the tide to straighten the tubing before it is lowered into a trench dredged in the river bed. Empty oil drums support the weight. Inset shows Bill Crane, frogman who explores the murky depths to inspect the job.

Carolina Power & Light Company Cables Go Under Cape Fear River at Wilmington

Workmen for CAROLINA POWER & LIGHT COMPANY recently probed the cold and murky depths of Cape Fear River on a project unusual in North Carolina. They laid four 5-in. tubes for submarine cables across the 1,200 ft span. The project involved a rubber-suited "frog-man" who swam the river depths to inspect the work.

The new cables will supply Wilmington, North Carolina, with more power from the new Louis V. Sutton plant. W. R. Buchanan of Raleigh, CP&L engineer in charge, said that the under-river route cost less and would be more reliable.

Old 11,000-volt cables already crossed the river, but they rest on the bottom and are subject to damage by dredges or dragging anchors. The new ones are encased in seamless steel tubing and are buried well below the reach of wayward anchors or dredges.

Spectators have been attracted by the work of "Frogman" Bill Crane. Equipped with an aqua-lung holding 40 minutes' supply of air, Crane swims free on the river bottom to see that the heavy tubes rest properly in the trench in which they will be buried. After cables are inserted, the tubes will be filled with oil under pressure to exclude moisture. Two empty tubes will be sealed under high pressure until cables are added to accommodate future electric needs.

Cleaver-Brooks, Maryland

CLEAVER - BROOKS COMPANY announces the appointment of the DELVAL EQUIPMENT CORPORATION as manufacturers' representative for the sale of Cleaver-Brooks boilers and equipment.

Located at 4610 North 15th Street in Philadelphia, its territory will include the state of Delaware, eastern Maryland, southern New Jersey and eastern Pennsylvania.

Cleaver-Brooks Company manufacturers equipment for the generation and utilization of heat. Among its products are oil, gas and combination gas/oil fired stationary boilers, mobile steam boilers, evaporators, distillation equipment and industrial gas and oil burners.

Moore-Handley—Alabama

LOCKE H. JONES, JR. has been appointed Machine Tool Sales Manager of MOORE-HANDLEY HARDWARE CO., INC., Birmingham, Alabama.

Mr. Jones has 18 years experience in engineering and machine shop work with one of the largest manufacturers in the Birmingham district. He is a mechanical engineer and worked five years as an industrial engineer.

Moore-Handley represents many machine tool builders including R. K. LeBlond lathes, Seneca Falls lathes, Landis Tool Company grinders, Gallmeyer & Livingston grinders, Van Norman milling machines, Fosdick drills, Peerless hacksaws, and Cincinnati electric tool grinders.

More News—Page 86

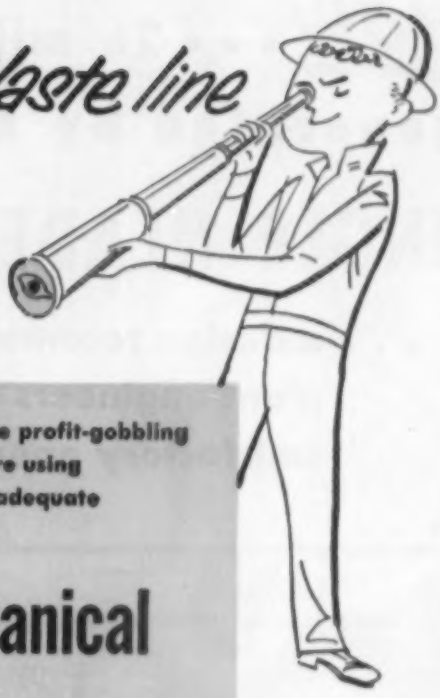
B&W Names Rogers—St. Louis

The appointment of J. N. ROGERS as a district salesman assigned to the ST. LOUIS, MO. office of the Tubular Products Division of THE BABCOCK & WILCOX COMPANY has been announced.

Mr. Rogers has been associated with B&W since 1947. Prior to his appointment as a district salesman, he served as office manager at the division's Chicago sales office.

Mr. Rogers will make his headquarters at the division's St. Louis office located in the Continental Building at 3615 Olive Street.

Watch your pump's Waste line



Stuffingboxes can become profit-gobbling WASTE LINES if you are using old-fashioned packing or inadequate sealing methods...

BJ Mechanical Seals

remove the waste and the worry... eliminate unnecessary leakage... prevent contamination of pumped liquid... protect against volatile liquid hazards... handle high temperatures... do away with repacking expense and repacking downtime losses. Byron Jackson makes a reliable Mechanical Seal for almost every centrifugal pump requirement. ***Byron Jackson Co.,*** *Since 1872.* P.O. Box 2017, Terminal Annex, Los Angeles 54, California, Sales Offices in Principal Cities.

You'll do better with...

NOW . . . 26 million pounds of steam/hr. generated by RILEY units with the

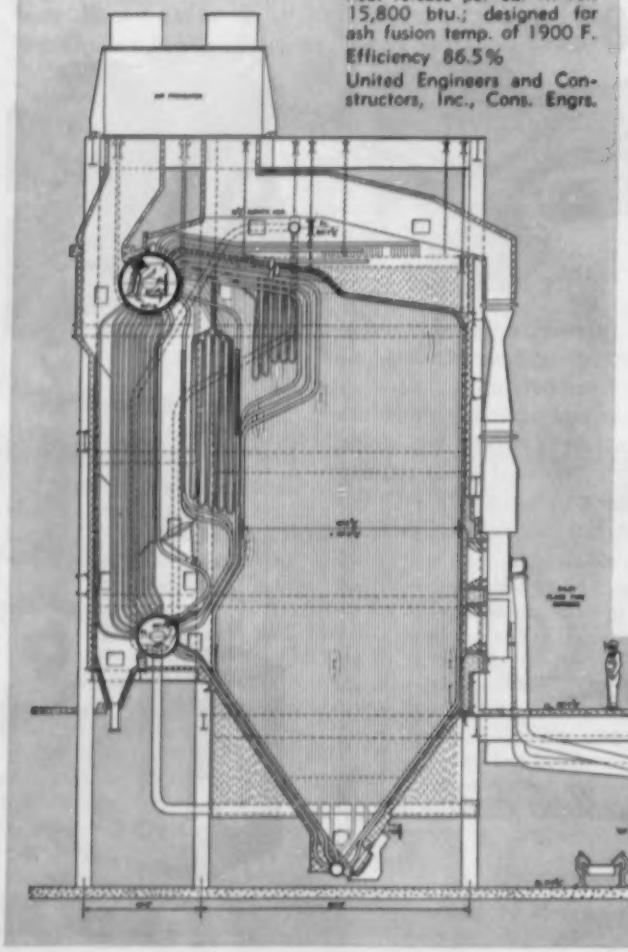
*SINGLE HEADER HOPPER BOTTOM

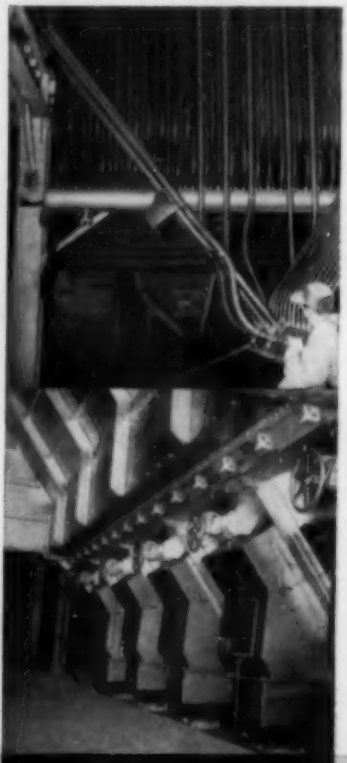
. . . a design recommended by scores of power plant engineers and consulting engineers for its satisfactory operation and money-saving features.

*Patented

Western Electric Company Hawthorne Works, Chicago, Ill.

Capacity 150,000 lbs/hr. 835 F/1000 psig; furnace heat release per cu. ft. vol. 15,800 btu.; designed for ash fusion temp. of 1900 F. Efficiency 86.5%
United Engineers and Constructors, Inc., Cons. Engrs.



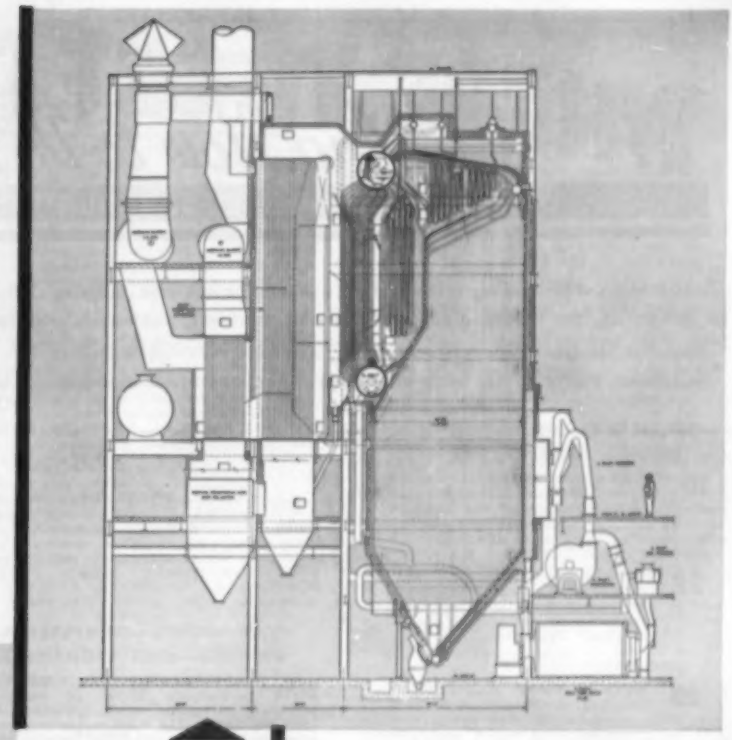


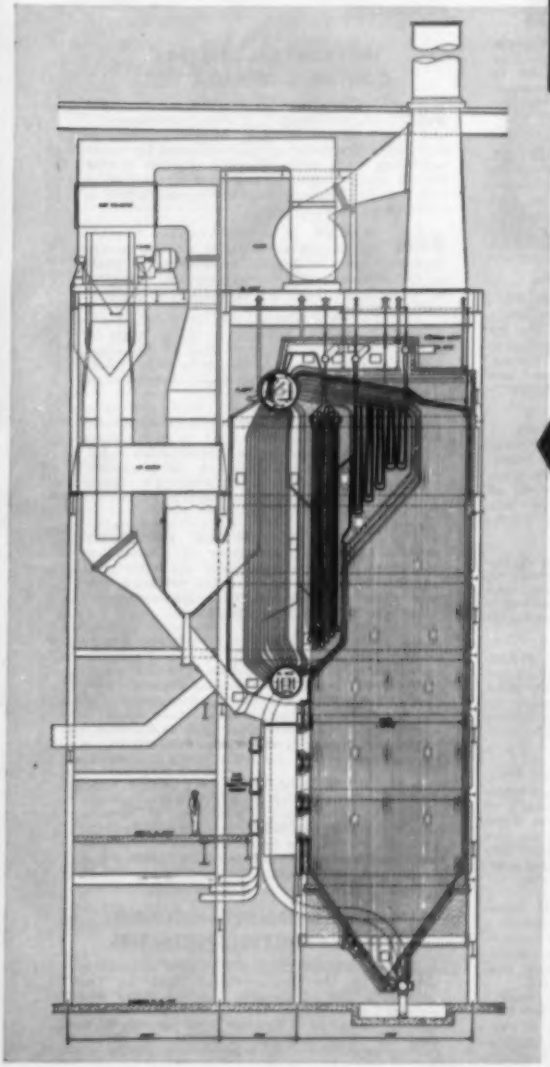
Partial tube assembly of Single Header Hopper Bottom. Offset tubes at header provide openings for ashes to pass into ash removal system. Lower sidewall header is shown.

Typical ash removal system for Riley Single Header Hopper Bottom showing gate controls, access doors, and pipe for hydraulic system.

Your nearest Riley Representative will gladly furnish you with further details about Riley Single Header Hopper Bottom installations, or write to Riley Stoker Corporation, Dept. A, Worcester, Massachusetts.

- Successful with all types of high ash coals, even with ash fusion temperatures as low as 1900 F. No ash removal difficulties.
- Ideal for units firing a combination of coal, oil and/or natural gas, or, where coal may be used in the future.
- Integrated design eliminates the cost of separate hopper, and seals between unit and hopper with their maintenance.
- A convenient pneumatic or hydraulic ash removal system may be added.
- Reduces over-all building height . . . permits higher capacity unit in existing building.
- Adaptable to units of any capacity.





Dairyland Power Cooperative
Cassville, Wisconsin
Capacity 230,000 lbs/hr; 900 F/1000 psig; furnace heat release per cu. ft. vol.-19,300; designed for ash fusion temp. — 1980 F. Efficiency 86.0%
Vern E. Alden Co., Consulting Engineers.

South Carolina Public Service Authority
Moncks Corner, S. C.
Capacity 450,000 lbs/hr.; 900 F/925 psig; furnace heat release per cu. ft. vol.-17,000; designed for ash fusion temp. — 2150 F. Efficiency 87.7%
Ford, Bacon & Davis, Consulting Engineers.

A few users of over 150 units sold

Otter Tail Power Co.
Central Ohio Light & Power Company
Bird & Son, Inc.
So. Nevada Power Co.
Upper Peninsula Generating Company
Western Colorado Power Co.
City of Rochester, Minnesota
Central Electric Power Corporation, Linn, Mo.
Waldorf Paper Products, Inc.
Esso Standard Oil Co.
General Electric Co.
Allis-Chalmers Manufacturing Co.
Ohio Oil Company
Goodyear Tire & Rubber Company
Hooker Electrochemical Co.
North American Aviation
United Aircraft Company
Celanese Corporation
United States Steel
Syracuse University
U. S. Rubber Co.
White Pine Copper Co.
City of Holyoke, Mass.

A few prominent consulting engineers

Sargent & Lundy • Ebasco Services • Chas. T. Main • Day & Zimmerman • Rust Engineering Co. • Albert Kahn • Vern E. Alden • Gilbert Associates, Inc. • Sanderson & Porter • The Kuljian Co. • Ford, Bacon & Davis • Jackson & Moreland • Burns & McDonnell • Lockwood Greene • Stone & Webster • H. M. Wilson Co.

A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

10 **SPREADER STOKER**—New Catalog — Describes the A-E perfect spreader stokers, featuring the answers to 14 basic questions essential to the choice and application of stokers.—AMERICAN ENGINEERING CO.

22 **SPREADER STOKER** — Bulletin 800, 16 pages—Illustrates and describes RotoStoker Type C-C, a relatively small spreader stoker for boilers and steam generators from approximately 5,000 to 75,000 lb per hr steam output.—DETROIT STOKER COMPANY.

23 **ROTARY SOOT BLOWERS**—Bulletin 1005-A—Gives concise description with cross-section view of the Vulcan P-3 manually operated rotary soot blower. Includes sketches to show ease of maintenance through simplified design.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

28 **FUEL BURNER PROTECTION** — Fireye Bulletin CP21, "Guarding Your Properties Against Flame Failure Explosions" — Gives a complete, non-technical explanation of the explosion danger inherent in fuel burning equipment and the protection which is now available.—COMBUSTION CONTROL CORPORATION.

45 **OIL BURNERS**—Bulletin AD-102, 8 pages—Describes a complete line of oil burners for industrial and commercial applications giving specifications, illustrations, features and applications.—CLEAVER-BROOKS CO.

51 **WATER-TUBE STEAM GENERATOR**—Booklet "Type A," 8 pages—Gives data and specifications for complete factory assembled steam generator units in nine sizes, from 5200 to 23,000 lb per hr, for pressures up to 400 psi, designed to provide fully automatic firing with oil, gas or stoker-fired coal.—SUPERIOR COMBUSTION INDUSTRIES, INC.

56 **WATER TUBE BOILERS**—Booklet —Describes details of stoker—oil or gas or combination gas/oil, 10 to 250 hp to 250 psi; designed for easy conversion to any fuel.—QUEEN CITY ENGINEERING COMPANY, INC.

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69 **UNDERFEED STOKERS**—Bulletin SB-27—Describes the design and application of the Erie City underfeed type stoker—with suggestions as to the solution of your particular problem.—ERIE CITY IRON WORKS.

76 **GAS BURNER** — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing — in a horizontal plane through fire doors or small openings over handfired coal grates or stokers — or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY.

83 **STEAM GENERATORS & BOILERS** — Bulletin P-1, 6 pages, describes oil, gas or combination boilers for processing and heating plants. Sizes 18 to 500 hp—15 to 200 psi. Complete installation and performance information. CYCLOTHERM DIVISION, UNITED STATES RADIATOR CORP.

89 **AXIAL FLOW IMPULSE TURBINES**—Bulletin S-145—Describes single pressure stage, multi-velocity turbines. Contains complete description, approximate dimensions, and many illustrations.—THE TERRY STEAM TURBINE CO.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

108 **RECIPROCATING COMPRESSOR** —Bulletin M-70, 44 pages—The M-Line multi-stage, multi-cylinder, 100 to 5000 hp, 250 to 514 rpm reciprocating compressors. Applications and installations illustrated with photographs and cut-away views.—THE COOPER-BESSEMER CORP.

111 **CENTRIFUGAL PUMPS, SINGLE STAGE, DOUBLE SUCTION**—Bulletin 225—Gives exterior and sectional views, engineering features and specifications, and dimensions, rating table, etc., of Type DB and DBM single stage, double suction pumps 30 to 200 gpm, 20 to 170 ft total head, 1150 and 1750 rpm.—WARREN STEAM PUMP CO., INC.

114 **CENTRIFUGAL COMPRESSORS**—Bulletin 109—Describes single stage centrifugal compressors from 30 to 600 hp and pressures from 1¼ to 25 pounds pressure. Their functions, applications, ratings, construction features and arrangement are presented.—AMERICAN BLOWER CORPORATION.

118 **ROTARY PUMPS**—Catalog 955, 8 pages—Describes and illustrates complete line of Roper Rotary Pump products. Sizes range from ⅝ to 600 gpm for pressures up to 1000 psi. Has listing of materials of construction, performance data and dimensions.—GEO. D. ROPER CORPORATION.

122 **FAN EQUIPMENT**—Catalog 515—Covers Clarage portable ready units, complete "package" fans for light-duty ventilating and industrial service. 18 sizes available, capacities 100 to 12,000 cfm.—CLARAGE FAN COMPANY.

155 **PROPORTIONING PUMPS**—Bulletin 52—Contains data on chemical feed packaged units made up of sturdy steel storage tank and high pressure low capacity proportioning pump—application and specification data.—THE BIRD-ARCHER COMPANY.

167 **ROTARY PUMPS**—Bulletin 307—Describes the features and advantages, and outlines the engineering details of Blackmer rotary pumps. These have been manufactured since 1904 and incorporate the outstanding advantages of "automatic adjustment for wear," and economical replacement of parts.—BLACKMER PUMP CO.

170 **PUMPS IN GENERAL**—All types of horizontal and vertical pumps—deep-well turbines—boosters, process pumps, non-clog, approved type fire pumps, axial-flow, boiler feed, domestic water and specialty pumps.—PACIFIC PUMPS, INC.

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INSTRUMENTS—METERS CONTROLS—REGULATORS

226 **PRESSURE GAUGES** — Ashcroft Gauge Catalog, 124 pages—Information on pressure gauges, gauge accessories and gauge engineering, sectionalized by product lines, fully indexed, with selector tables for all gauges. Illustrated with photographs and line drawings.—MANNING, MAXWELL & MOORE, INC.

228 **GAUGE ILLUMINATOR** — Supplement ML—Describes a high power mercury lamp in special housing to fit back of water gauge inserts, to increase visibility of water level reading.—RELIANCE GAUGE COLUMN CO.

229 **BOILER GAGES** — Data Unit — Shows a complete line of Jerguson gages and valves for steam service pressures from 250 to 1500 lb wsp.—JERGUSON GAGE & VALVE CO.

250 **DIAL THERMOMETERS**—Bulletin 355 — Describes dial thermometers intended to give accurate temperature readings and improved efficiency in process—vapor pressure actuated, with flexible tubing or rigid stem connections.—THE POWERS REGULATOR CO.

257 **AUTOMATIC STEAM PRESSURE CONTROL**—Bulletin 462—Describes the Leslie pressure controller for supplying intermittent make-up to a low pressure system from a high pressure line—positive, faithful.—LESLIE COMPANY.

261 **BOILER FEED CONTROL**—Bulletin 489, 16 pages—Copes Performance Report covers Copes multi-element feedwater control at Georgia Power Company, including a concise description of steam production at Plants Yates, Atkinson, and Arkwright.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

267 **EASY READING THROUGH LIQUID LEVEL INDICATOR**—Bulletin WG-1822—Gives the advantages of remote liquid level indicators reporting at convenient sight level, the levels in boilers, heaters, tanks and other vessels—up to 1500 psi.—YARNALL-WARING COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

305 **INDUSTRIAL HEATING** — Catalog 50, 50 pages—Gives data on the type and size of electric heating units and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications.—EDWIN L. WIEGAND CO.

325 **SMOKE STACKS, STEEL OR IRON** — Catalog 200-B — Describes types, characteristics, and applications of various smoke stacks.—J. J. FINNIGAN CO. INC.

326 **GRATING—FLOORING** — Catalog, 12 pages—Gives picture story of "Weldforged" steel grating, flooring and stair treads—continuous spiral cross bars, alternating right and left, and slightly above bearing bars, electronically weldforged into inseparable units to insure greater non-skid protection and durability. — KERRIGAN IRON WORKS, INC.

333 **STORAGE SPHERES** — "The Hortonsphere", 8 pages—Describes the advantages of storing highly volatile liquids and gases under pressure in Hortonspheres. Tables show sizes ranging from 1000 to 30,000 bbl, operating pressures of 30 to 215 psi in standard diameters from 32 to 80 ft.—CHICAGO BRIDGE & IRON CO.

356 **INDUSTRIAL SPACE HEATERS**—Bulletin GNC-10-52 and EDH-1-53—Picture and describe direct fired space heaters in sizes from 100,000 Btu to 1,000,000 Btu—oil or gas fired, floor mounted or suspended.—PRAT DANIEL CORP.

366 **INDUSTRIAL HEATERS**—Bulletin RC-10-53—Describes the Thermobloc heat producing machine producing heat in any desired quantity and placing it where needed—an independent unit heater using the economical principles of direct heat transfer—low cost, automatic operation, tempered air, ease of installation, complete range of sizes from 100,000 Btu per hour to 1,000,000 Btu per hour.—PRAT-DANIEL CORP., THERMOBLOC DIV.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

410 **PIPE HANGERS**—Bulletin 153, 12 pages—Describes National counterpoise pipe hangers for high temperature piping systems in steam plants, refineries, chemical plants, and the like. Graphs give aid in selection. Dimensions, erection and field adjustment instructions. Illustrations of typical installations.—NATIONAL VALVE & MANUFACTURING COMPANY.

411 **STEAM TRAPS**—Bulletin No. 2133, 8 pages — Includes physical data, prices on cast iron and forged steel inverted bucket steam traps, air and air relief traps. How to calculate condensate loads.—ARMSTRONG MACHINE WORKS.

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459 **STEEL UNION**—Bulletin P-100—Points out the advantages of a patented, inexpensive steel union of new design, with one inserted bronze seat and polygonal pipe ends, made of rugged pipe coupling stock.—DART UNION COMPANY.

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521 **WELDING AND FLAME CUTTING OF WROUGHT IRON**—Bulletin—Gives complete information on the processes and procedures used in welding wrought iron, and flame cutting wrought iron. A complete information on physical properties of wrought iron welds. Additional section on Flame Descaling.—A. M. BYERS CO.

533 **REMOVAL SCALE AND RUST**—Booklet 4393-R-12—Tells how to remove scale and rust, using Oakite Compound No. 32—giving greater safety, efficiency and higher load factor to various elements in all sorts of plants and operations.—OAKITE PRODUCTS, INC.

538 **PRODUCTS FOR PROCESS INDUSTRIES** — Bulletin 1P-25A, 8 pages—Describes industrial insulation, refractories and insulating brick for furnaces, ovens and kilns, overhead and underground pipelines, packings, gaskets and other products used generally in process industries.—JOHNS-MANVILLE, INC.

584 **AIRWAY MARKING PAINTS**—Bulletin—Describes Aerox orange and white paint conforming to U. S. specifications for marking airways and similar applications for both metal and wood. This paint is often used in conjunction with Subalox Anti-Corrosive Paint. SUBOX, INC.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

602 **SUPERCHARGED GAS DIESEL ENGINES** — Bulletin J-52 — Gives complete specifications and data and suggested applications of the Type JS supercharged gas Diesel engine, vertical four cycle, 6 and 8 cylinder, stationary, noted for exceptional fuel savings.—THE COOPER-BESSEMER CORP.

608 **BELT LACING, FASTENERS** — Bulletin A-60 gives information on Alligator belt lacing for joining conveyor and transmission belts. Bulletin F100 covers Flexco belt asteners which are used for fastening heavy duty conveyor and elevator belts.—FLEXIBLE STEEL LACING CO.

620 **DOUBLE PITCH CONVEYOR AND POWER TRANSMISSION CHAINS** —Catalog No. 54, 30 pages—Describes American Standard stock chains having figure 8 contour links, and chain pitch twice that of corresponding American Standard roller chains.—DIAMOND CHAIN COMPANY, INC.

621 **POWER TRANSMISSION AND EQUIPMENT** — Catalog 40 — Gives comprehensive details of a complete line of power transmission including V-Belt drives, flat belt drives, pulleys, gears, chains, sprockets.—Industrial Division of CONTINENTAL GIN CO.

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155	167	170	188	195	226	228	229	250	257	261	267	305	325	326	333	356
366	410	411	433	441	459	496	511	515	518	521	533	538	584	602	608	620
621	633	672	694	715	716	738	772	797	803	811	836	871	904	906	911	935
992	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15	R-16
R-17	R-18	R-19	R-20	R-21												

Also send further information on following New Equipment (page 101)

F-1 F-2 F-3 F-4 F-5 F-6 F-7 F-8 F-9 F-10 F-11 F-12 F-13

Name ..... Position .....

Company Name .....

Street .....

City ..... Zone ..... State .....

633 **DISPATCH SYSTEMS** — Bulletin AD-1—Illustrates complete range of overhead carriers equipped for automatic transfer and dispatch of materials under varying conditions in various industries.—AMERICAN MONORAIL CO.

672 **INDUSTRIAL COMPRESSORS** — Bulletin M-70—Describes a new comprehensive M-Line compressor, with engineering and design information on the complete line of power driven reciprocating compressors from 100 to 5000 hp.—THE COOPER-BESSEMER CORP.

694 **STOCK ROLLER CHAINS AND SPROCKETS**—Catalog No. 754, 66 pages—Describes and illustrates Stock roller chains and sprockets including minimum and finished bore, ready-to-use Taper-Lock bushed sprockets, as well as chain selection and application data.—DIAMOND CHAIN COMPANY, INC.

WATER TREATMENT, HEATING, VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

715 **PRIMING COAT FOR STEEL TANKS** — Bulletin I — Describes a method of removing mill scale from carbon steel plates, angles and channels by dipping them in sulfuric acid, wash water, and phosphoric acid bath and then applying a special coat of priming paint to the outside surfaces while the steel is still warm. This Phoscoto process removes mill scale and leaves a thin iron phosphate coating on the surface which improves the bond between the paint and the steel.—CHICAGO BRIDGE & IRON COMPANY.

716 **COOLING WATER TREATMENT**—Bulletin 33—Explains the Nalco 33 Method, which uses a new corrosion inhibitor in conjunction with low pH, to prevent scale and corrosion in large recirculating cooling water systems.—NATIONAL ALUMINATE CORPORATION.

738 **ZEOLITE WATER SOFTENERS**—Bulletin—Describes in detail the operation and application of Cochrane hydromatic single-control-valve Zeolite softeners which combine operations in a single unit for service, back-wash, brine and rinse, and two stand-by positions.—COCHRANE CORP.

772 **UNIT HEATERS**—Bulletin No. 300, 8 pages—Complete design and application information on the new Thermobloc direct fired unit heater, delivering 550,000 Btu per hour of draftless heated air at efficiency of 82 to 86%, burning No. 3 oil or lighter, or gas, and occupying a floor space of only 39 inches in diameter.—PRAT-DANIEL CORPORATION.

797 **REACTIVATORS** — Bulletin WC-103A — Describes reactivators for rapid economical water clarification and softening, for cold process softeners and clarifiers; operational details, advantages, and typical flow sheets.—GRAVER WATER CONDITIONING CO.

ELECTRICAL

803 **LIGHTING STANDARDS**—Catalog 31 F, complete with engineering data and illustrations—Shows "Weldforged" lighting standards for plant property, streets, highways, playgrounds, churches, housing projects, shopping centers, plants of all sorts—also mast arms and brackets.—KERRIGAN IRON WORKS, INC.

811 **ELECTRIC HEAT**—"100 Ways to Apply Electric Heat" gives a wealth of informative data on the use of electric heat in industry—fast, uniform, dependable, backed by nation-wide engineering service.—EDWIN L. WIEGAND CO.

836 **MINING CIRCUIT BREAKERS**—Bulletin 5207 — is an illustrated technical bulletin published in advance of forthcoming application data for electrical protection in coal mines. Included are a resume of Bureau of Mines findings on circuit breaker application and a preliminary outline of an I-T-E publication on mine sectionalization.—I-T-E CIRCUIT BREAKER COMPANY.

871 **ELECTRICAL PROTECTION**—Protection Handbook — Tells how to protect motors, apparatus and circuits. Gives National Electrical Code requirements in simplified form. Designed to help the electrical or plant maintenance engineer.—BUSSMANN MFG. CO.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

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911 **VACUUM CLEANING** — A-710, 12 pages, describes the diversified cleaning job, particularly in the grain milling industry, performed by Hoffman heavy duty vacuum cleaning equipment.—U. S. HOFFMAN MACHINERY CORP.

935 **METAL STAMPING FACILITIES**—Brochure No. 100—Describes shearing, blanking, drawing, forming, embossing, assembly and finishing equipment in Campco's modern Carolina plant which offers Southern industry convenient, modern facilities for metal stamping. Plant has 67 major units of equipment, including a 300 ton hydraulic press. From design through delivery, Campco converts your production ideas into finished metal products.—CAROLINA METAL PRODUCTS, INC.

992 **FIRE PROTECTION**—Bulletin 3313 describes Blaw-Knox Deluge systems, wet and dry pipe sprinkler systems, water spray and fog systems, rate-of-rise sprinkler systems, etc., and indicates how a sprinkler system pays for itself out of insurance savings. — BLAW-KNOX SPRINKLER DIV., BLAW-KNOX CONSTRUCTION CO.

Continued on page 108

6-55-2

Please send me without obligation, free booklets described in the June, 1955, issue of SOUTHERN POWER AND INDUSTRY as circled below.

10	22	23	28	45	51	56	60	69	76	83	89	108	111	114	118	122
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366	410	411	433	441	459	496	511	515	518	521	533	538	584	602	608	620
621	633	672	694	715	716	738	772	797	803	811	836	871	904	905	911	935
992	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15	R-16
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List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

FOR DRIVES LIKE THESE···

SELECT
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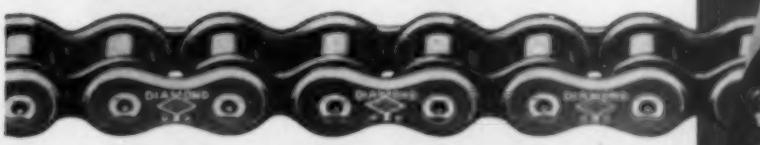
and SPROCKETS



With so wide a range of *stock* Roller Chains and Sprockets now available, drive requirements can be met in the shortest possible time.

Whether the drive center distances are short or long; speeds high, low, or medium; Diamond Roller Chains will do the job. And power transfer, in large or small amounts, presents no problem. New Catalog 754 covering *stock* Chains and Sprockets will help you to the correct selection.

DIAMOND CHAIN COMPANY, Inc.

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Dept. 612, 402 Kentucky Avenue, Indianapolis 7, Indiana

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Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

ALWAYS PRELOADED

For many, many years, Diamond Chain has been preloaded after assembly for the purpose of bringing pin-bushing seating into stabilized relationship prior to field installation.

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You will find complete information, helpful illustrations and useable tables on how to select a stock roller chain drive, how to calculate chain length, speed ratios for sprocket combinations; installation recommendations, single and multiple-strand chains—all pitches; flexible chain couplings, double pitch chains, conveyor chains, etc., etc.

Write for this 64-page Catalog 754 today.

Finished-Bore Sprockets complete with keyways and setscrews
Taper-Lock Sprockets with replaceable bushings to meet wide range of bores
DIAMOND
ROLLER CHAIN
Labeled and Packaged 10' Lengths of Chain. Reels for 50' and over.

Cooper-Bessemer Flexibility Helps M & A Green Forest Plant Win "Top-Rated" Honors

Another Example of Efficient Power at Lower Cost

Here's one of the four Cooper-Bessemer LSV's that furnish dependable, low cost power in M & A's award winning Green Forest Plant.

• FOR THE FOURTH SUCCESSIVE YEAR the Diesel Progress annual award for the most efficiently operated REA internal combustion plant goes to a Cooper-Bessemer powered station . . . M & A Electric Power Cooperative's Green Forest Plant near Poplar Bluff, Missouri.

Here, four 16-cylinder Cooper-Bessemer LSV engines, each rated 3300 hp at 327 rpm, helped win the coveted bronze plaque by producing 58,945,000 kw. hours at a net cost of only 6.41 mills per kilowatt hour.

Even with varying combinations of fuel, and changing power load demands, these Cooper-Bessemer engines offer reliable performance and long-lasting economy. In part, this is done through automatic controls, utilized to quickly, economically convert from gas-diesel to oil-diesel in the event of low gas pressure, and back again to gas-diesel when normal pressure is restored.

Another feature of the M & A plant is the compact design of the Cooper-Bessemer V-type engines. *More* power can be concentrated per square foot of floor space for less extensive, less expensive engine foundations. For further information on heavy-duty Gas-Diesel, Diesel or Gas engines, contact the nearest Cooper-Bessemer office.

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Boiler
Refractories
Bulletin R-36
CONTENTS:
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FIREBRICK PAGE 7
INSULATING FIREBRICK PAGE 9
REFRACTORY CASTABLES PAGES 11 AND 13
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New 20-page Handbook
FOR SELECTING BOILER REFRACTORIES
Contains detailed discussions of critical refractories areas in both refractory-lined and water-cooled boilers. Your local B&W Representative will be glad to send you a copy. Just ask for Bulletin R-36.
The Babcock & Wilcox Company
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D-558

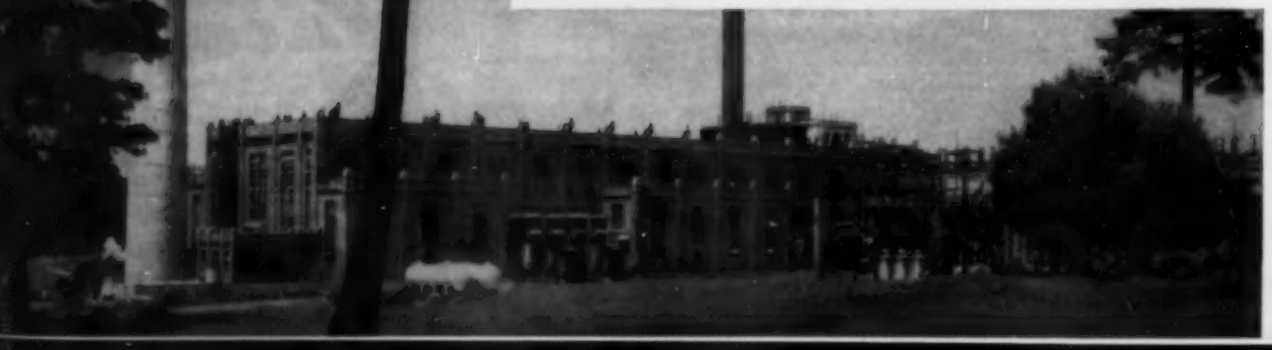
Copes-Vulcan helps to make MORE

THE ALL-OUTDOOR Louis V. Sutton Steam Electric Generating Plant of the Carolina Power & Light Company at Wilmington, N. C. Copes-Vulcan Combustion Control, Boiler Feed Water Control, and Automatic-Sequential Soot Blowing help to maintain maximum boiler efficiency.

REPEAT ORDER for Copes-Vulcan Boiler Control and Pump Recirculation

from Carolina Power and Light Company for the Cape Fear Steam Electric Station

Copes-Vulcan maintains perpetual interest in every installation *after* it is in service. And throughout the life of the equipment, trained Copes-Vulcan servicemen will regularly visit the plant to check performance and see that everything is functioning as it should. If you'd like this attention on your jobs, give Copes-Vulcan a crack at the control and cleaning of your next boiler.



POWER FOR CAROLINA

At Carolina Power & Light Company's new outdoor installation, the Louis V. Sutton Steam Electric Generating Plant, steam is generated in two coal-fired boilers designed for 1750 psi at 1005 F. Unit 1 is a Combustion Engineering steam generator with a design load capacity of 950,000 pph. Unit 2 is a radiant-reheat Babcock & Wilcox boiler designed for 900,000 pph, with a reheat to 1005 F. Copes-Vulcan control helps keep these steam generators efficient.

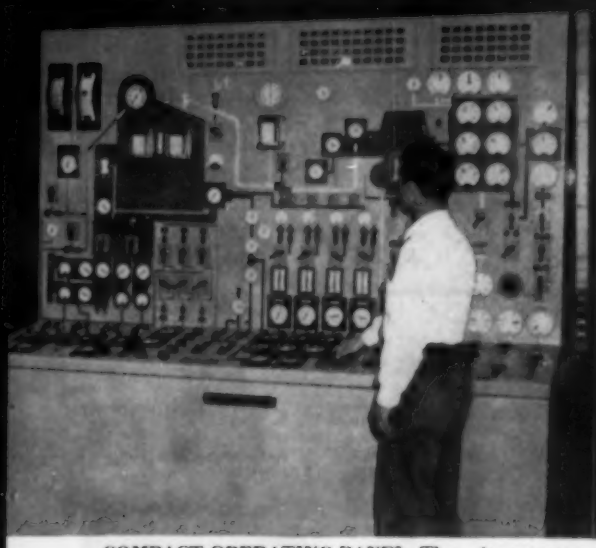
BOILER CONTROL

A Copes-Vulcan Combustion Control System accurately regulates the fuel and air for proper combustion. Copes Type 3-L Feed Water Control matches the feed flow to the steam demands and maintains a constant drum level. Copes provided 10-inch, 1500 pound standard motor-operated feed water by-pass control valves. Copes-Vulcan control and valves give automatic recirculation for protection of three boiler feed pumps.

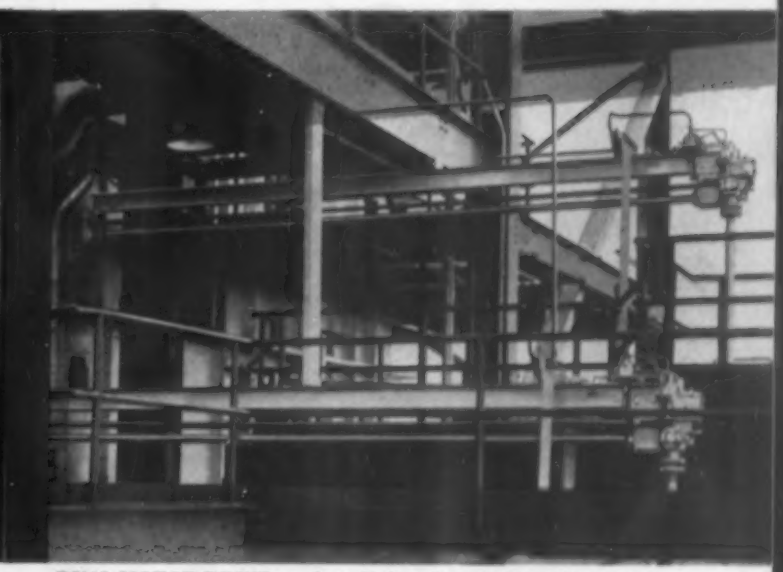
BOILER CLEANING

The Vulcan Automatic-Sequential Soot Blowing thoroughly cleans the heating surfaces. Air is the blowing medium in both units. Air motors drive the blowers in Unit 1; Electric motors drive those in Unit 2. Cleaning elements include Vulcan long retractables, wall deslaggers, rotaries, and air preheater cleaning controls.

Write for complete information about Copes-Vulcan Boiler Controls and Soot Blowers.



COMPACT OPERATING PANEL. There is one operator in the central control room at the Louis V. Sutton Generating Plant.



DUAL-MOTOR DRIVE on these Vulcan Long Retractables and the Vulcan Wall Deslaggers give more complete cleaning than single-motor drive, leaving *no* surface unblown.

COPES-VULCAN DIVISION

CONTINENTAL FOUNDRY & MACHINE COMPANY

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COPES VULCAN

...of all these ELGIN Water Softener features...

- which do you consider most important?

1 DELIVERS UP TO 44% MORE SOFT WATER. The ingenious "Double-Check" manifold system permits a *deeper* zeolite bed, which delivers as much as 44% more soft water than water softeners of conventional design and equal size. No stretching your supply to the danger point!

2 ZEOLITE LOSS PREVENTED. "Double-Check" manifold also prevents loss of expensive zeolite during backwash period. A *real* money saver, with zeolite costs as they are!

3 REQUIRES LESS SPACE. To deliver a soft water output to equal Elgin's, *any* other water softener would have to be 44% bigger. Elgin lets you take advantage of limited space!

4 BETTER BACKWASHING. "Double-Check" design provides better, more thorough backwashing which keeps zeolite clean, active and more receptive to salt regeneration. This assures peak operation year after year!

5 LOWER OPERATING COSTS. Better service means lower costs in the long run! With cleaner, more active zeolite, regeneration takes less salt and wash water.

6 LOWER MAINTENANCE COSTS. Heavy duty construction throughout offers you greater permanence with an Elgin Water Softener. Combine that with the zeolite-saving, more efficient "Double-Check" manifold system, and you get lower overall maintenance costs and added years of service!

7 MORE ECONOMICAL TO BUY. Even though the Elgin Water Softener provides all these outstanding features, when you figure cost per thousand gallons of soft water delivered, lower maintenance cost and time saved, you'll find it your most economical buy.

Elgin offers you a complete line:

MANUAL • PUSH-BUTTON AUTOMATIC • FULLY AUTOMATIC

Equally advanced in design are other Elgin Ion-Exchange Systems which provide Alkalinity Reduction, Deionization, Silica Removal and Hot Zeolite Softening.

Write or call us for further information concerning your water conditioning needs . . . or better still, let us put our near-by representative in touch with you!

ELGIN SOFTENER CORPORATION

ELGIN-REFINITE DIVISION

132 North Grove Avenue, Elgin, Illinois

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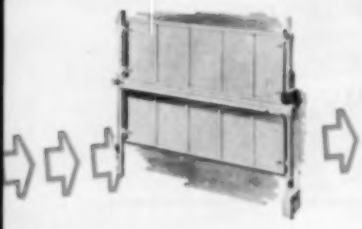
taking the extra stresses

Freight elevators need extra ruggedness of design to stand up under industrial power truck loading "punishment." The arrows in the diagrams at the left show how impact stresses vary when the elevator platform is level, below or above the landing. They also show the effects of a fast braking stop. These and the stresses of off-balance loading, and extra static loading are at work, not singly, but simultaneously and in endless combinations—as described in detail in Otis Heavy Duty Freight Elevators booklet B-705.

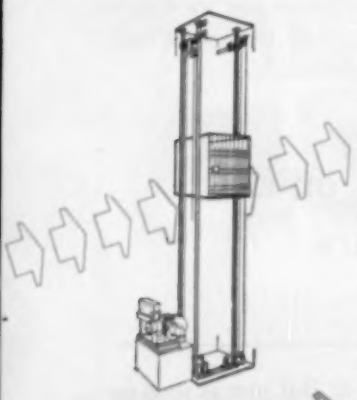
simplifying multi-floor handling

Freight elevators can easily be made to step up the efficiency of floor-to-floor production lines. The same electronic skill ***that developed automatic operatorless AUTOTRONIC® elevators for busy office buildings*** is ready to make completely automatic freight elevators an integral part of vertical production lines. This thinking can be applied to new buildings, to new elevators for existing buildings, and to modernizing outmoded light duty, general duty and heavy duty freight elevators.



time-saving hoistway doors

Otis power-operated biparting hoistway doors open while the car levels. This is a major time-saving feature. As compared with manual operation, automatic power operation is safer, quicker, smoother, and materially reduces round-trip time for busy freight elevators. The electric door operator does not depend on "coast" but drives the doors and car gates quietly to the fully opened and closed positions—as described in Otis Hoistway Doors booklet A-389 for new installations and modernization.



save costly building alterations

Otis Light Duty freight elevators have a semi self-supporting framework that permits installation in new and existing hoistways without reinforcing the building, or adding overhead supports, or building a penthouse. They can be used for any rise up to 35 feet at a speed of 25 feet per minute with lifting capacities of 1,500, 2,000 and 2,500 pounds. They're described in Otis booklet B-720.

value of a maker's pride

A perfectly performing installation is Otis' best salesman. That's why Otis maintenance is planned to keep elevators running like new—***year after year!*** Preventive maintenance is ***engineered service by the maker*** that prevents slowdowns and breakdowns; extends elevator life by 50%; eliminates expensive, unexpected repair bills; keeps replacement parts readily available; and provides 24-hour-a-day service on a nationwide basis with factory-and-field trained men that have a knowledge of elevatoring that can't be matched.

OTIS ELEVATOR COMPANY, 260 11th Ave., New York 1, N.Y.

OFFICES AND SERVICE IN 295 CITIES ACROSS THE U. S. AND CANADA

directional arrows

for MATERIALS HANDLING

- Light, General and Heavy Duty FREIGHT ELEVATORS
- DUMBWAITERS
- HOISTWAY DOORS
- MODERNIZATION
- MAINTENANCE
- PASSENGER ELEVATORS

Otis

Why is the fireman always poking at the fire today?

We have a new lot of coal and it clinkers badly. He's digging the clinkers out and covering up holes in the fuelbed.

Don't holes in the fuelbed make clinkers?

They sure do! And the air required for combustion goes through these holes and we can't keep the steam pressure up.

Why did we buy such coal?

Well, it was a few cents cheaper and we didn't consider the analyses so nobody realized it had such a low clinkering temperature.

So we save pennies on the coal and blow dollars up the chimney!

Yes sir! That's about the size of it. But just as soon as this lot is used up, we're going back to the old coal. That was specified for us by the Chesapeake and Ohio Fuel Service Engineers to give us the lowest *steam cost* with our type of stoker and boiler. We should have stuck with the coal they recommended – it never gave us a bit of trouble.

P.S. There's a lot more to buying coal than the cost per ton. For facts and figures to solve your particular fuel requirements, write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake & Ohio Railway Company, Terminal Tower, Cleveland 1, Ohio.

Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL

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The Ultimate Tribute to Quality...

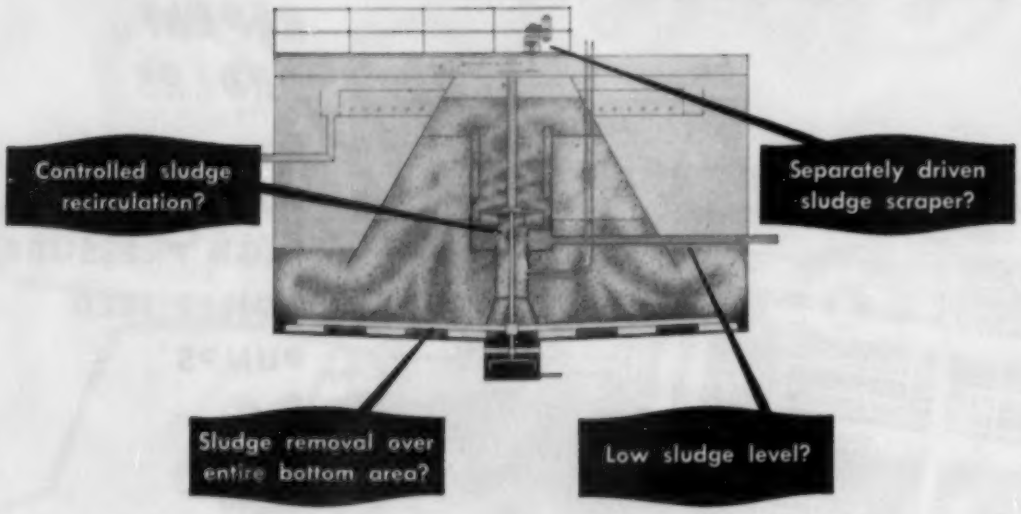
150% REPEAT ORDERS from users of PACIFIC HIGH PRESSURE BOILER FEED PUMPS

PACIFIC PUMPS INC.

Write for BULLETIN 122 for details

WHICH FEATURES...

ASSURE THE CLEAREST WATER?


Controlled sludge recirculation?
Separately driven sludge scraper?
Sludge removal over entire bottom area?
Low sludge level?

They <u>all</u> help to produce clear water. But only when all four features are combined in a single unit can you be sure of a dependable and economical supply of clear water at all times. The GRAVER REACTIVATOR®, a cold process softener and clarifier, is designed to combine <u>all</u> these features. Forty-five years of water conditioning experience have gone into this design — a design that has a proven, successful performance record in hundreds of installations.

WRITE FOR DESCRIPTIVE CATALOGUE WC-103A

GRAVER

GRAVER WATER CONDITIONING CO.
A Division of Graver Tank & Mfg. Co., Inc.
216 West 14th Street, New York 11, N. Y.

West Penn Power Company selected Gulfcrest Oil to lubricate this 140,000 kilowatt unit on the basis of its outstanding performance in the other turbines at their Springdale, Pennsylvania Plant.

—they looked at the record and again selected

GULFCREST OIL

When the West Penn Power Company looked at the record of Gulfcrest Oil in its seven turbine units at Springdale, the choice of lubricant for Number Eight was no problem—Gulfcrest again!

Here's what the record showed: In each of the seven units the original fill of Gulfcrest had been in service for years without any significant changes in its characteristics. And of course the turbines operated continuously and dependably during this period.

A record like this did not just happen. It is the result of careful selection of crude oils that are thoroughly refined, then super-refined by Gulf's exclusive Alchlor Process, which removes the unstable hydrocarbons that remain after normal refining. This discarded portion, if allowed to remain in a turbine oil, accelerates oxidation, increases neutralization number, forms sludge, and harmful acids.

So to insure safe, long-lasting protection for your turbines, specify Gulfcrest—the world's finest turbine oil. Contact your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade.

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ENGINEERS — CGC — ATLANTA • DALLAS • MEMPHIS • KNOXVILLE — CGC — MANUFACTURERS

NEW YORK CITY

Performance-- Value...

FIG. 16003—600-Pound Steel Pressure Seal Gate Valve.

FIG. 6061 WE—600-Pound Stainless Steel Swing Check Valve.

. . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . .

FIG. 3003 WE—Steel Gate Valve for 300 Pounds W.S.P.

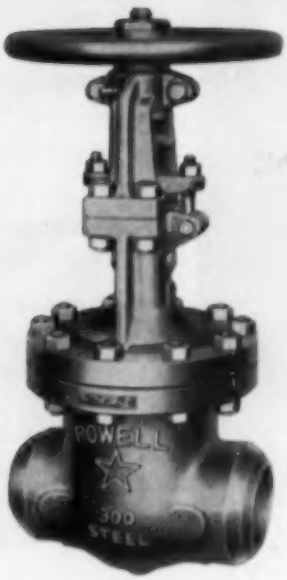


FIG. 1793—Iron Body, Bronze Mounted, Gate Valve For 125 Pounds W.P.

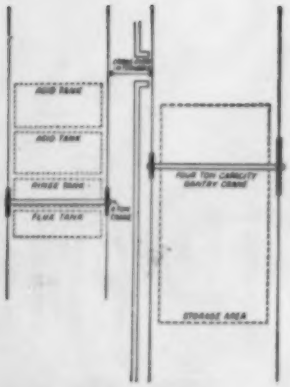
Powell Valves

You can depend on outstanding *performance* from every valve made by The Wm. Powell Company, for Powell Valves have a proven record of long life and dependable service.

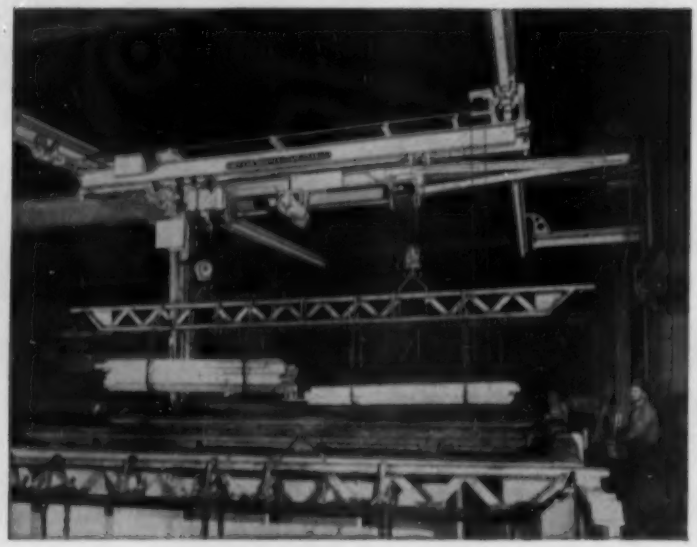
And Powell Valves give you better *value!* They're precision made and incorporate many quality features—features that can save you money and give you lasting flow control.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our *COMPLETE quality line*, and help solve any flow control problem you may have.

The Wm. Powell Company, Cincinnati 22, Ohio . . . . . 109th year



AMERICAN MONORAIL GANTRY CRANE SYSTEM *speeds galvanizing!*



Steel fence posts travel from fabrication to galvanizing over a gantry bridge which interlocks at a crossover track through doorway for passage to the MonoRail crane serving the tanks in the plating room.

All travel on the 4-ton system is motor operated and controlled by push-button station in the operator's hand.

Here is truly team-work handling that results in cost savings as well as increased tonnage through the galvanizing process. It is a typical example of American MonoRail engineering available at no obligation for the solution of your handling problems.

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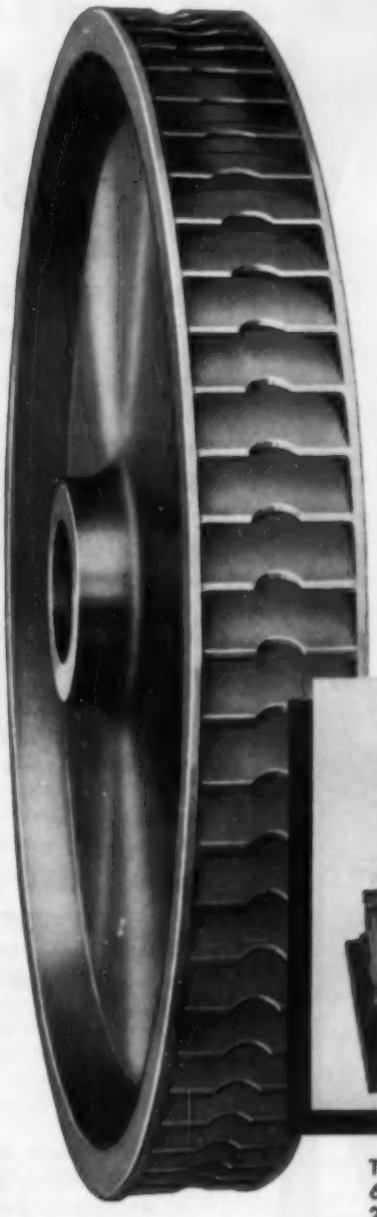
TERRY SOLID-WHEEL *SIMPLICITY* MEANS *SUSTAINED* HP



A Terry solid-wheel turbine is simplicity itself. Particularly the rotor. This is a single forging of special composition steel. And, unlike a built-up wheel, has no separate parts to loosen or work out.

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Perhaps you, too, can profit from Terry solid-wheel stamina. Bulletin S-116 gives complete details. Send for a copy today.

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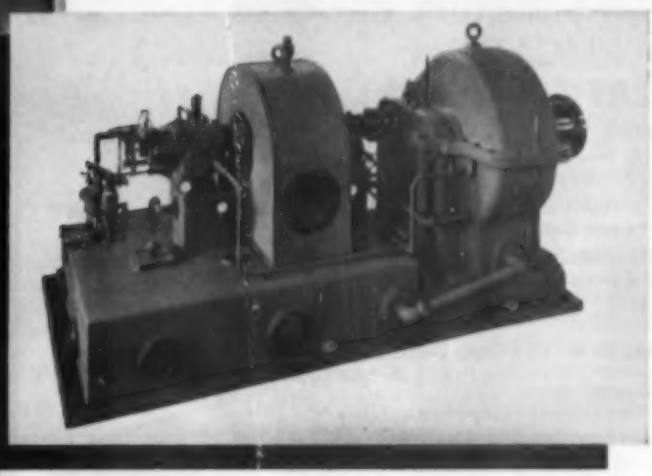

This Terry solid-wheel turbo-geared unit is rated 600 hp, 4000/650 rpm for 820 psi, 825°F steam with 275 psi back pressure.

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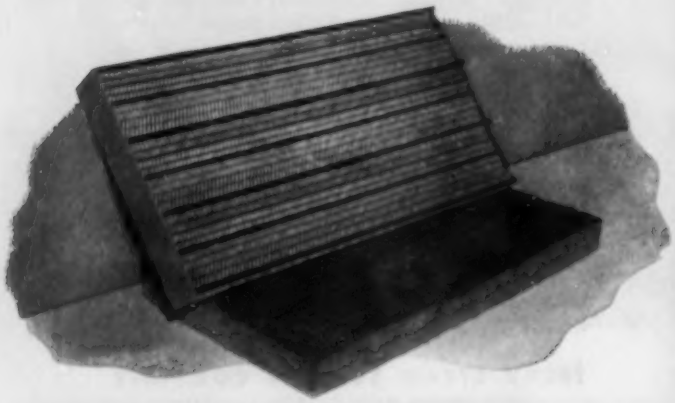

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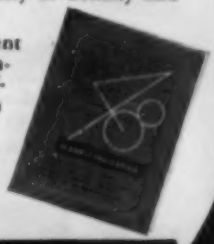

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SP&I's "Helping the Man-in-the-Plant" department (see page 82) features, ideas, methods and gadgets — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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Petro Industrial Oil Burners

PAID FOR THEMSELVES DURING THE FIRST YEAR

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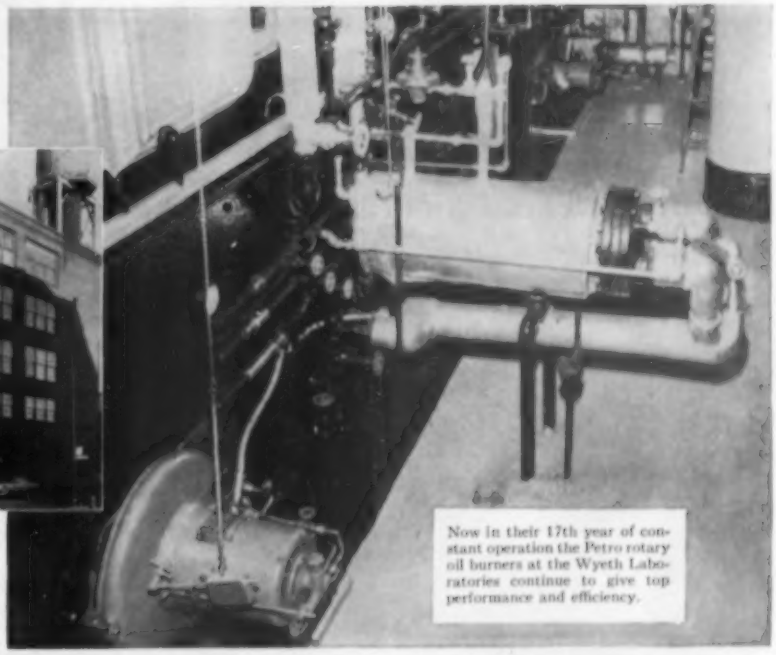
WYETH LABORATORIES, INC.
Philadelphia, Pa.



Now in their 17th year of constant operation the Petro rotary oil burners at the Wyeth Laboratories continue to give top performance and efficiency.

"Petro oil burners saved us $6,349 on fuel the first year—and in addition we enjoy better heating and more horsepower from our boilers," says E. C. Beeler, Plant Engineer.

FUEL SAVINGS JUST DON'T HAPPEN —there has to be a reason—and the Petro "Thermal Viscosity System" is the reason Petro equipment owners all over the country save thousands of dollars every year! It's a simple, foolproof fuel preheating system which lowers the viscosity of the low-cost, heat-rich heavy oils and enables users to burn them with complete reliability.

Here's how it works

To properly fire No. 6 oil, the oil must be *warmed* so that it will thin out and ignite easily and atomize efficiently. To accomplish this vital need Petro burners have a magnetic valve which is controlled by the oil temperature and will not admit oil to the rotary atomizing cup until it is warm enough to fire properly. The oil is circulated through automatic heaters until the proper temperature is reached. Heaters are of ample capacity to supply warm oil for any firing need.

Thus Petro oil burners assure owners (1) accurate metering of oil (2) fine, thorough atomization (3) quick starts, no smoky fires (4) no slug of cold oil in lines to cause faulty starts.

No manual attention is required

The entire operation is automatic. There are no involved mechanical controls requiring adjustment or maintenance.

Saves labor costs—saves fuel costs

Why don't you find out how much Petro industrial oil burners can save for you? They are quickly adaptable to nearly every existing boiler. Send in the coupon for full information.

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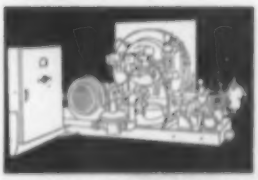

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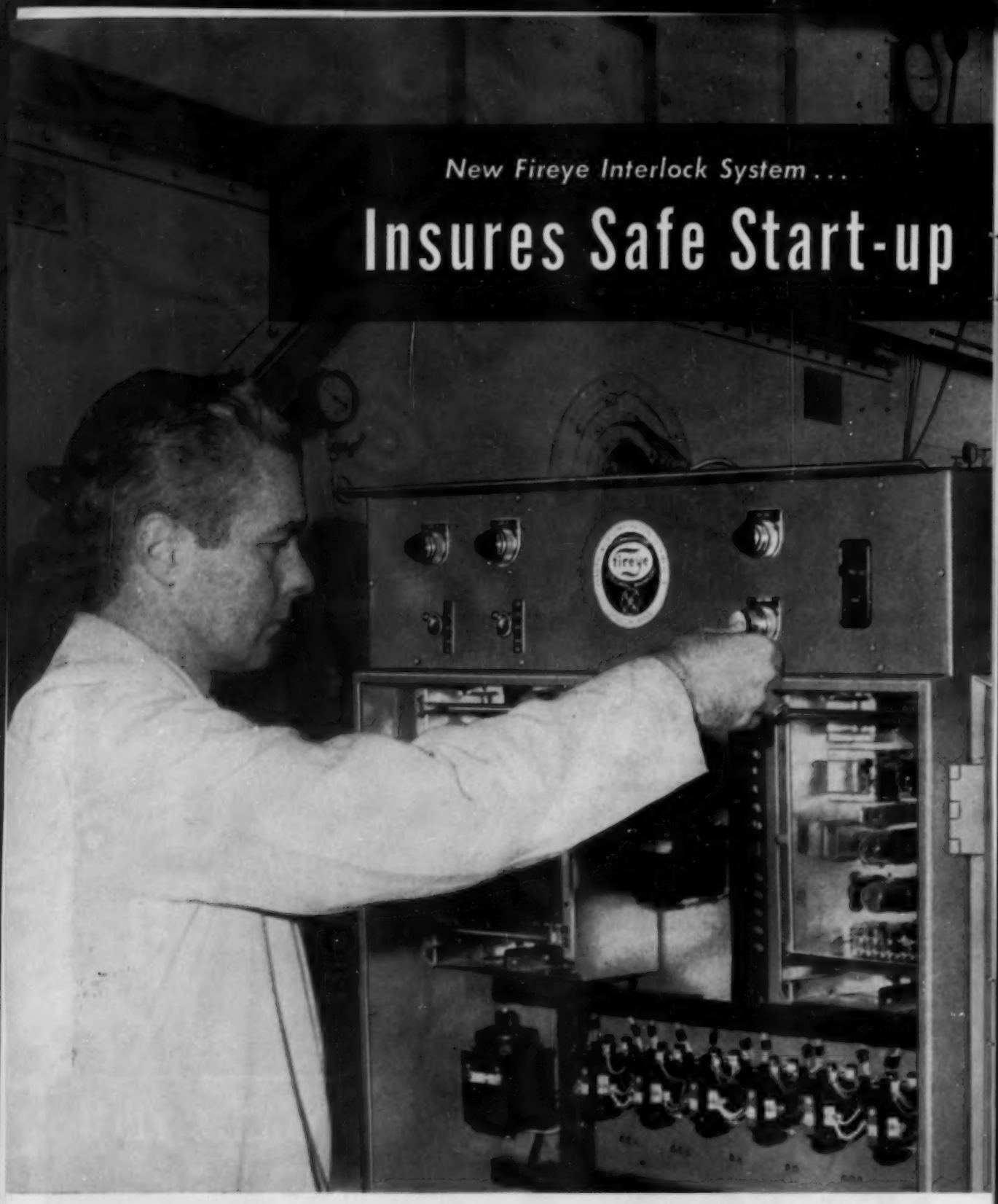

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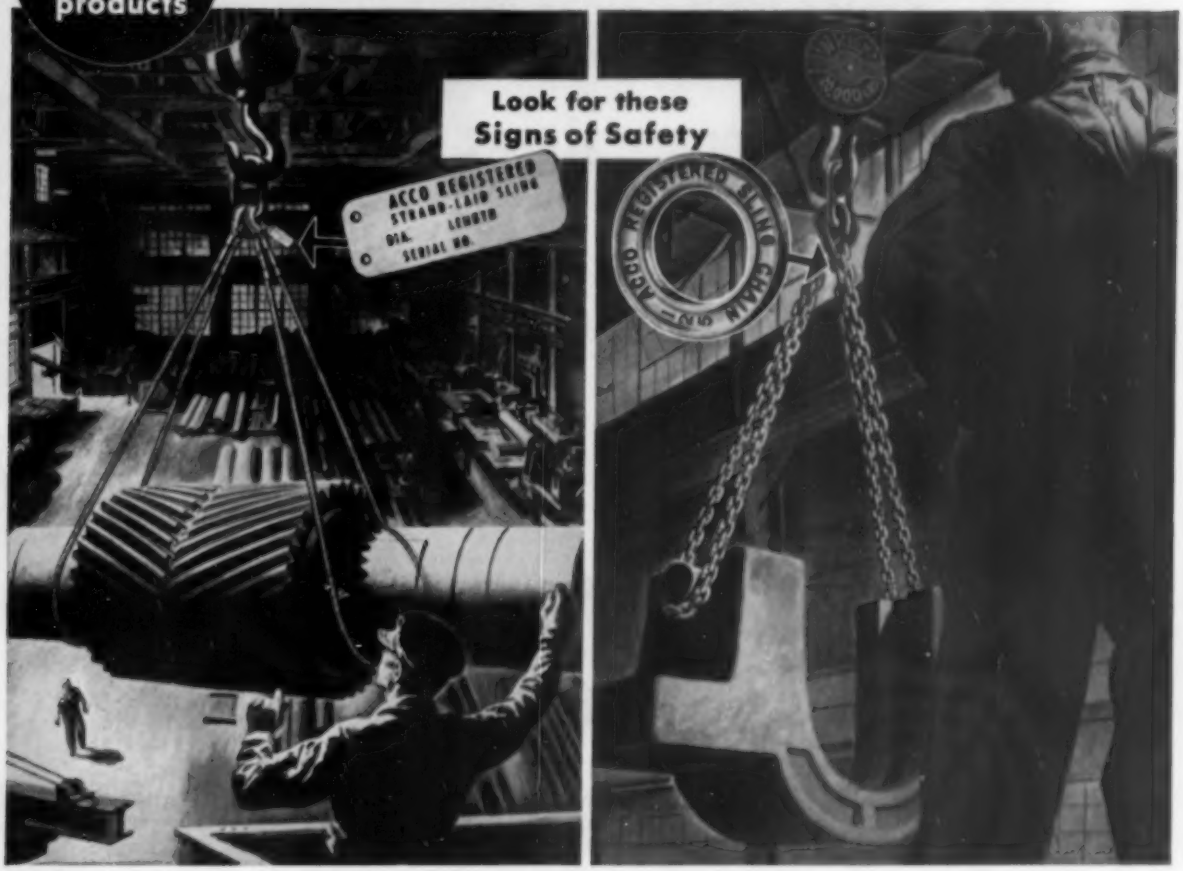

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• Materials Handling is one of the most costly production operations, yet insurance of uninterrupted flow of materials is necessary for efficient and economical production. Regardless of how well production is planned, a dropped load can be very costly even without involvement of personal injury. Time is consumed, machining operations already completed can be rendered valueless, and, if a major machine tool is involved, the whole line is shut down.

ACCO *Registered** Slings are materials handling tools specifically designed to require less hook-up time and through their proved safety actually protect *against* production interruptions. All this is money saved and safety gained.

ACCO *Registered* Safety Is More Than Skin Deep

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For example, the special ACCO Hooks used in these slings are forged, heat-treated to insure standardized strength, proof-tested, inspected, and magna-fluxed. NOTHING IS LEFT TO CHANCE.

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Compare the assurance given by this careful control of quality, strength, and design with the methods used in fabricating old fashioned, "home-made" slings.

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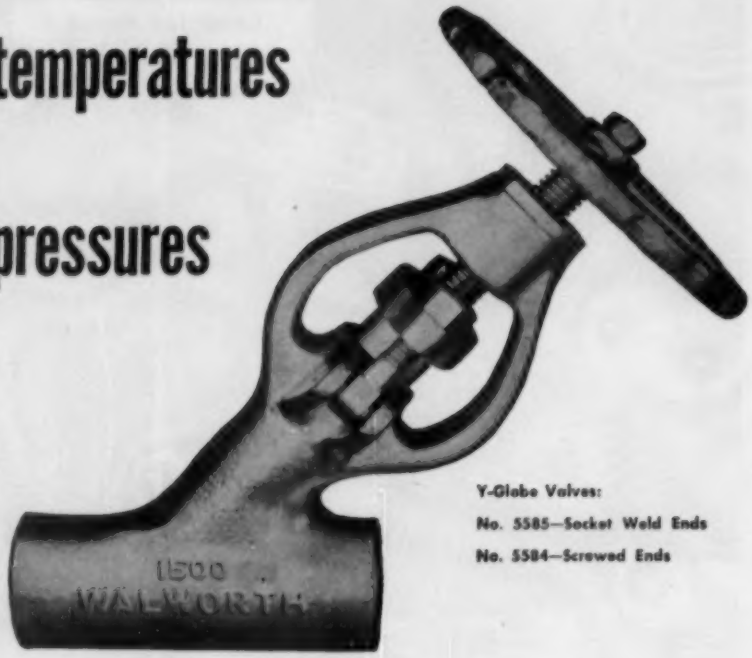

Y-Globe Valves:
No. 5585—Socket Weld Ends
No. 5584—Screwed Ends

Walworth is proud to make these new Small Cast Steel Valves available to power stations . . . oil refineries . . . ships . . . wherever piping is subject to severe pressures and temperatures. Non-shock service ratings of these valves: 1500 psi–950F for steam; 3600 psi–100F for water, oil or gas. Cast of chromium molybdenum steel, they are compact and light, yet exceptionally strong. Both Y-Globe and Angle type valves are available.

Angle Valves:
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Simplified Walworth design eliminates many of the valve problems encountered in high pressure service. Among the features of this new valve are:

INTEGRAL BODY AND YOKE – made from a single casting without threading or welding. Bonnet joint — always a potential source of leakage — is eliminated. Valves can be reassembled quickly and easily.

ROTATING DISC – prevents valve seat distortion and consequent leakage. Cuts down replacements.

WELDED SEAT RING – compensates for changes in pressure and temperature—eliminates a major source of leakage.

SPECIAL BACK SEAT BUSHING – permits repacking the valve under pressure with greater safety.

PACKING CHAMBER – designed to dissipate heat thus keeping packing rings at lower temperatures—gives them longer life.

These valves are available with either socket weld ends or screwed ends, in sizes ranging from ¼ to 2 inches. For further information on Walworth series 1500 Small Cast Steel Valves, see your local Walworth distributor, or write for Circular No. 134.

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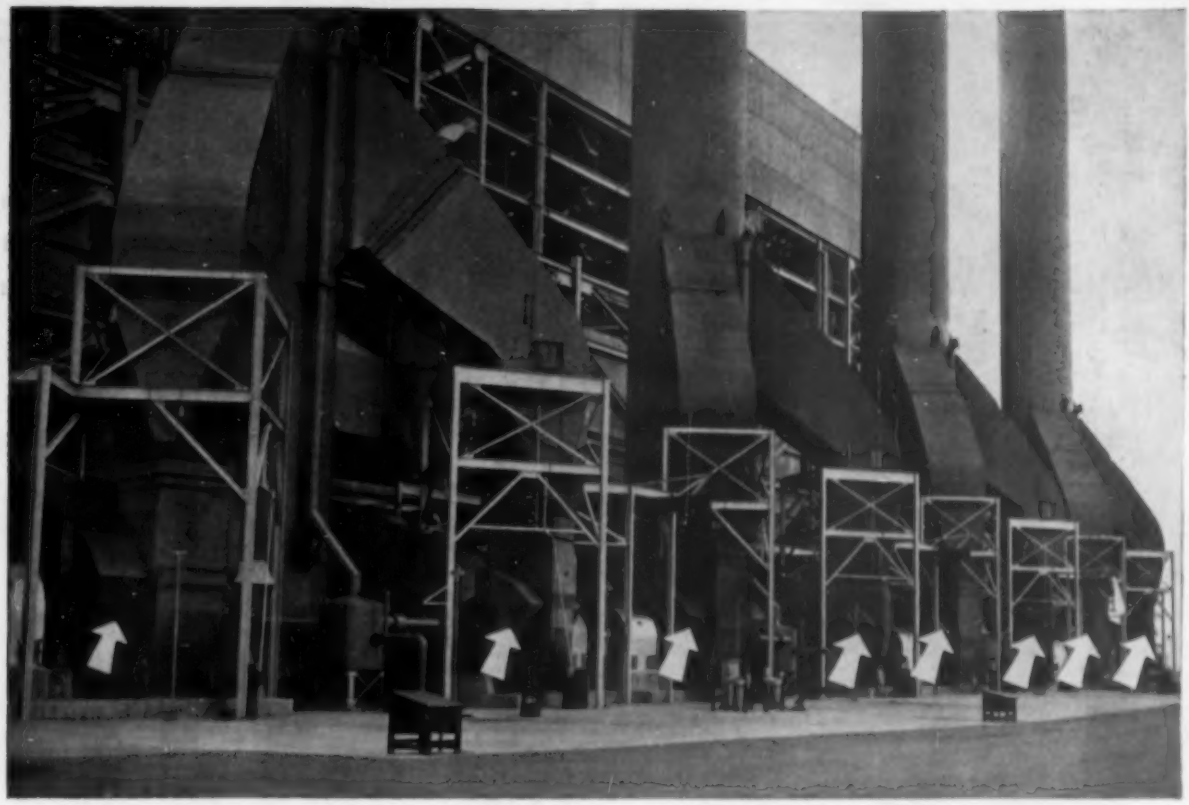

Pacific Gas & Electric Company's Pittsburg (California) Station

New Pacific Gas & Electric's Pittsburg Station . . . 660,000 KW . . . Uses 16 Westinghouse Mechanical Draft Fans

Largest Steam Plant in West Uses Westinghouse Fans for Induced and Forced Draft

Here, eight Forced Draft and eight Induced Draft Westinghouse Fans and Motors serve four boilers, each producing 1,135,000 pounds of steam per hour at 1850 psig and 1,000° F.

Two Forced Draft Fans driven by 900 hp motors provide 219,000 cfm each at 20.1" static pressure.

Two Induced Draft Fans driven by 920/1250 hp motors move 358,000 cfm at 375° F., 10.7" static pressure to each boiler with provision for coal firing.

These mechanical Draft Fans are specifically designed for outdoor installation.

For power generation—or for any other air handling job, let Westinghouse-Sturtevant put air to work for you—economically, efficiently.

FOR MORE FACTS on the industry's most complete air handling line, call on the "Man with the Facts", your Westinghouse-Sturtevant Sales Engineer, or fill in the handy coupon below.

Over-all view of Pacific Gas & Electric Company's Pittsburg Station showing four huge boilers and 16 Westinghouse Forced Draft and Induced Draft Fans.

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RIGHT! You will find many different reasons behind the 353 major industrial developments that took place along our lines last year—and the 3,584 over the past ten years. Abundant natural resources. Plentiful manpower. Growing markets and other economic advantages.

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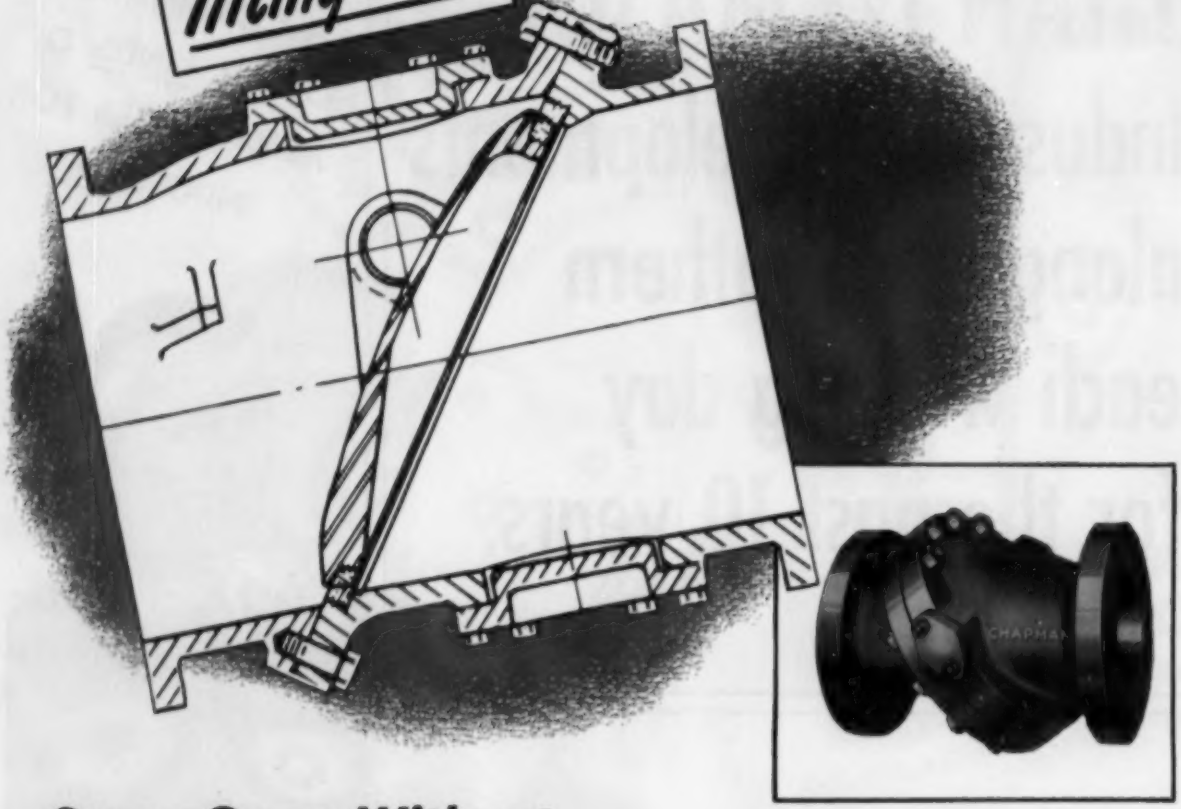

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When flow starts to reverse, the uniquely designed disc swings quickly to the closed position, cushioned by fluid pressures, and then drops to a tight seal against the seat, without sliding or scraping. Closure is fast, tight . . . and *quiet*. Slamming is *eliminated*, in all but unusual piping arrangements.

Freedom from vibration and slamming, low wear and low head loss keep maintenance costs down, give years of more efficient service. For every check valve service, specify Chapman's Tilting Disc. Available in steel or iron, with suitable trim to meet service conditions. Full engineering data are in Catalog 30. Write for it today.

The Chapman Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

Industry Can't Afford to Let Technical Men Drift Along Aimlessly

THE GROWING need for engineering training and specialization was emphasized recently by a man who has done much to further the latest area of specialization — atomic energy. He is **Granville M. Read**, chief engineer of **E. I. du Pont de Nemours & Co.**, Wilmington, Delaware. Mr. Read, who was in charge of design and construction of the Hanford Engineer Works for the production of plutonium, addressed a gathering at the diamond jubilee spring meeting of the **American Society of Mechanical Engineers** at Baltimore, Maryland.

"*To the free engineer, a frontier is merely an imaginary line to be crossed.* He is stimulated to experiment, to try the untried, to give full play to his resourcefulness and ingenuity. He is free to accept the technological challenge to be bold, to dig deeply into nature's mysteries, and to search everlastingly for new and better ways. He is guaranteed that neither king nor commissar can withhold his reward for success, nor condemn him to Siberia nor the firing squad as the penalty for failure.

"The American engineer also *operates in a free business climate.* He benefits from the continuous flow of technical knowledge produced by our vast network of industrial laboratories. This network in itself is the greatest engineering training ground in the world. Business leaders depend on his discoveries for increased productivity and for new and better products which steadily improve our way of living. The incentives of freedom spark the imagination of America.

"In this rich soil of opportunity, nourished by the God-given moisture of freedom, the young engineer starts from scratch. He has a free choice of his profession, for there is neither law nor custom to dictate that he must be a craftsman because his father was a craftsman. He is educated in the public schools, and is free to go on to any one of America's 2,000 institutions of higher learning. *The training of the American engineer begins in the free environment of his home, his church, his community, his schools.* And then he is ready to start his industrial training—the translation of academic knowledge into practical operations.

"The young engineer is industry's most valuable raw material. The sooner he can produce, the sooner industry will realize a return on its investment in him. This of course is a two-way street, for the engineer's own financial position improves as he advances through the organization. So the training problem is of mutual interest, and both industry and the engineer are acutely aware of its importance.

"*Sound industry can't afford to let its technical men drift along aimlessly and soak up experience the hard way.* The satisfactory development of an engineer requires guidance and counsel if he is to quickly master industrial techniques.

"Thomas Jefferson made certain that the United States would build a great educational system so that our youths would receive the academic training essential to the cultural and technical development of a free world. This system has been developed under the wise guidance of our educational leaders over the years, and it is the reservoir of knowledge on which industry must depend.

"But we all know that intellectual training doesn't necessarily mean an educated man, and that our colleges and universities are only the incubation period for producing technical competency. A graduate with a background of "A" averages may have a retentive memory, but this is no guarantee that he is capable of creative thinking and practical application.

"There is where industrial training can make its contribution, not as a substitute for the campus, but as an essential supplement to academic instruction. It takes time, and it costs money, but it is the best way to prepare the engineer to utilize his maximum skills and talents, and bring out his best efforts.

"We hear sometimes that this is an age of over-specialization. *While engineers should be well-rounded men, an integrated engineering effort demands specialized knowledge in a great many specific engineering fields.* Specialized training has a definite place in our du Pont program, but the engineers who enter these fields are older men who have gravitated into their specialization over the years through their own inclinations, desires and abilities. We never regiment engineers into a specialty, for we know through experience that this has been ineffective. I don't believe regimentation will even work in Russia."

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BORDEN ALL-WELD DESIGN

The best type for use where floors are subject to extreme corrosion or moisture — chemical plants, breweries and other process industries. There are no cracks, open joints, or holes in bars. This type made only in mild steel.

BORDEN RIVETED DESIGN

Most substantial and oldest design of grating made, permits perfect distribution of loads. Made on the truss principle, Borden Riveted Gratings are hydraulically power-forged for strength and durability. Particularly recommended for aluminum.

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INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

Industrial Development and Human Progress Go Together

Abstracted from comments by **Harold Brayman**, Director Public Relations Department, E. I. du Pont de Nemours & Company. His speech was presented before the **Second Annual West Virginia Industrial Development Conference**, Morgantown, West Virginia, April 15, 1955.

THE pessimists and some special interest groups try to convince us that we face the danger of overproduction. They even suggest that we have a mature economy. Some of them argue that improved technologies which enable us to make more products with less human effort will lead not to abundance, but to unemployment. The truth is quite the contrary.

As a matter of fact, I can think of no technological advancement that has replaced an older method that has not eventually multiplied employment opportunities by opening whole new fields of production. Mass production of automobiles may have created unemployment among wagon builders, but think of the vast new employment it created in the end.

What we need is more and better production methods. We must find ways to produce enough more to look after the needs of a population expanding at the rate of about 2½ millions a year and, at the same time, to continue to improve the standard of living which has been rising at the rate of about 2½ per cent a year.

This can be accomplished only through the application of our natural resourcefulness, through bringing our technical capacities to more of our people, through lowering our costs and improving the performance of our industry.

It has been that way in the past; it will be that way in the future.

Two thousand men in the modern Du Pont neoprene plant at Louisville, Kentucky, can produce as much rubber annually as 80,000 Malayans laboring all year from dawn to dusk on the plantations in the steaming jungles of Indonesia.

The difference is that the Americans have in the neoprene plant a multi-million dollar tool not available to their Asiatic counterparts.

This principle applies throughout all our economy, but unfortunately, it isn't generally understood. Our polls of public opinion, by and large, show that employees usually think well of the company that employs them, and a community usually thinks well of the businesses in that community. Yet the same polls indicate that the same employees and the same communities have a much less favorable opinion of business as an institution.

So to win the understanding of the people—who in the long run determine themselves what will be done—and to enlist their active cooperation and support for industrial expansion, it seems to me that we face constantly the problem of showing the relationship between business progress and human progress and how they necessarily go together. We must demonstrate that industrial development means more than mere factory building. It means new employment opportunities, additional tax revenues, and more goods to go on the counters of our retail stores.

Productivity has been tripled since the turn of the century by technological gains introduced by industry. Machines turned by electric motors do the heavy work in the shops just as they do in the homes. Since these new machines and new processes have cut costs and enable a man to turn out far more products in far less time, his employer pays much higher wages for a standard eight-hour, five-day week. If he is on the day shift, the sun is up when he goes to work and it is still up when he drives home in the evening to dig in the garden.

Even as compared to 25 years ago, the average American works 15 per cent fewer hours, and has 50 per cent more purchasing power. It is estimated that, if productivity continues to increase at the present rate, the cash income of the average American family by 1980 will be $6,600 a year, after taxes, in terms of present dollars.

Now I do not want to be misunderstood. I am not saying here that all's well with the world and we can rest on our laurels as we are. Far from it. There are injustices and frustrations which need to be corrected. There are many changes and improvements which need to be pushed. There are new developments that will require much ingenuity and skill. We have only reached a little hill-top from which we can see the far horizons. But, if we continue to place our reliance not on demagogic tricks, or fancy panaceas, but on the methods which enabled us to get to that hill-top, we can and shall and will reach the new horizons.

The industrial development with which you are so concerned today is the route which we can follow successfully.

NEW FACTORY SWALLOWS OLD AS MACHINES KEEP HUMMING →

By R. W. HOYT
Vice President and Chief Engineer
Double Seal Ring Company
Fort Worth, Texas

THE Double Seal Ring Co. of Fort Worth, Texas, has just about completed one of the biggest and most unusual projects in its 42 year history. A new factory building has been placed over the old one without stopping production of piston rings.

A wood-frame, sheet-metal manufacturing building 70 by 130 feet housed the machinery which turns out piston rings varying from 1 inch in diameter up to 8 feet in diameter. It was built during World War I, and through the years, had become dilapidated.

We could not build a new building on a new site without stopping production and income. Also the cost of replacing office buildings, stock houses, etc., that were still entirely satisfactory would have been high.

We needed more room, better light, and a sound, leakproof roof over our heads. We also wanted to eliminate the overhead obstructions in the factory. These were left from the old days of overhead lineshafts and also carried the lighting, air, and sprinkler systems.

Prefabricated Building

After considering several types of buildings, we decided to purchase a prefabricated rigid frame building wider, taller, and longer than the old one—and set it right over the top.

After studying and comparing various types of prefabricated buildings, we chose one 72 by 200 feet. The height of the eaves is 13 feet 9 inches and the height at the center of the roof is 27 feet.

The prefabricated building was purchased from Metallic Building Company, Houston, Texas. It was erected by the Delta Steel Building Company of Dallas, Texas.

Fill and foundation work at the east end was started first. FIGS. 1 & 2. At this end we planned on utilizing the slope of the land to construct a modern locker room capable of serving 150 men, below the factory.

Holes were cut through the roof to permit entry of the pre-welded vertical steel frame. The width of the new building is just 2 feet more than the old building. This necessitated cutting holes in the roof and providing 22 concrete piers to support the vertical frame members.

Engineer in Charge

Edwin Thomas, our Assistant Chief Engineer, was in charge of engineering plans and co-ordinating the various phases of foundation work and erection. When the foundation was completed, a convoy of trucks arrived, FIG. 3, from Houston carrying the entire frame and prefabricated building in knocked-down form.

All parts, FIG. 4, were unloaded and stacked in a pre-determined order on the ground. A crane with a 110 ft boom was ready at 10 o'clock one Sunday morning. This day was chosen for erection so that the electric current could be shut off as a safety measure.

FIG. 5 shows the first rigid frame being lifted. FIG. 6 shows frame number one just about 3 feet above its final resting place. Before dark that same day, all eleven rigid frames were in place and bolted down preliminarily. FIG. 7. The complete operation went without a hitch and was a tribute to fine planning all around.

The next morning production started up as usual. One complete side of the old building was open to the air, to provide clearance for the new rugged vertical frames. Construction men began at once to tighten the frames in place, install tie-rods with $\frac{5}{8}$ inch bolts, and to fasten on the .024 inch thick rolled corrugated aluminum sidings and roof.

At the end of one week the building was well along, FIG. 8. Ten days after the first frame was put in place, the roof was on.

FIG. 9 shows the old building inside the new metal building. At several points, the new roof cleared the old structure by less than 8 inches. In this picture, demolition of the old building by regular Double Seal employees, in their spare time, has started. The building was 95% covered only 14 days after the start of erection.

The completed building, FIG. 10, with ten 24 inch diameter rotary type roof ventilators in place, has a sturdy look. A month later, the east end had been cleaned up and a new shed for cast iron borings constructed.

Inside the plant, activity on demolition of the old building and supports continues and probably will not be finished for six months. Two superintendents' offices were placed on a second floor. After all the old supports are torn out, the supervisors will have a clear view over the 14,400 sq ft area—no obstructing vertical supports.

A new buss-duct electrical system was installed overhead. This will provide quick installation of new and transplanted machinery. A completely new 8 inch concrete floor will be poured over the old floor, a section at a time.

We are proud of our new plant and are pleased that the engulfing process did not stop production.

Simultaneously with the erection of the new building, new production equipment and inspection equipment was being installed. The new building and manufacturing equipment represents an outlay of $100,000.

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New Orleans Plant
Teaches How, When, and Where

Training Industrial Fire Fighters

THE old kind of fire brigade is obsolete—the brigade made up of men scattered throughout the plant, who, out of breath, excited and ignorant of the materials in the fire area, answered alarms to given spots; who, instead of putting out the initial fire quickly, often caused it to spread by doing the wrong thing. Some of the gigantic fires of the past two years would not have spread to their inordinate size had the right fire extinguishing methods been used at their start.

During the past few years there have been radical changes in the organizing and handling of industrial fire brigades. The ramifications of industrial fire fighting have extended far beyond the most daring ideas of ten years ago.

Industry has been compelled to conceive new ways to combat fire from flammable and combustible materials such as plastics, thinners, lacquers, glues, oil, gasoline, dust deposits from aluminum, etc. These materials are commonplace enough in their use until a fire starts or something explodes. Then it is imperative that men know what to do and how to do it quickly.

No two departments in an industrial plant, large or small, contain the same materials. A man working in the garage could not be expected to know what is being used in the paint department; nor could a man in the woodworking department know what the conditions are in the electrical department. But the men who work in those departments **do know.** Therefore, they are the ones who need specialized training in fighting the kind of fire which might occur in their own departments. How can they be thoroughly trained in the right procedure?

Methods Used

At the Higgins Shipyard in New Orleans a new plan has been perfected. The plant has been broken up into eleven zones, each of which has a fire supervisor and a squad of five or more men. No member of the squad is more than one minute from where a fire might occur in his section.

The twenty-two supervisors, eleven each on the first and second shifts, were trained by the drillmasters of the New Orleans Fire Department. At the conclusion of their training these supervisors with the safety director and his assistants, trained the squad members.

This training was extensive. It went far beyond that of laying out hose lines, attaching nozzles, raising ladders, etc. Every member was taught how to use all types of chemical extinguishers, what each would and would not do. When a fire occurs these men know instantly what type of extinguisher to use to put it out and not spread it.

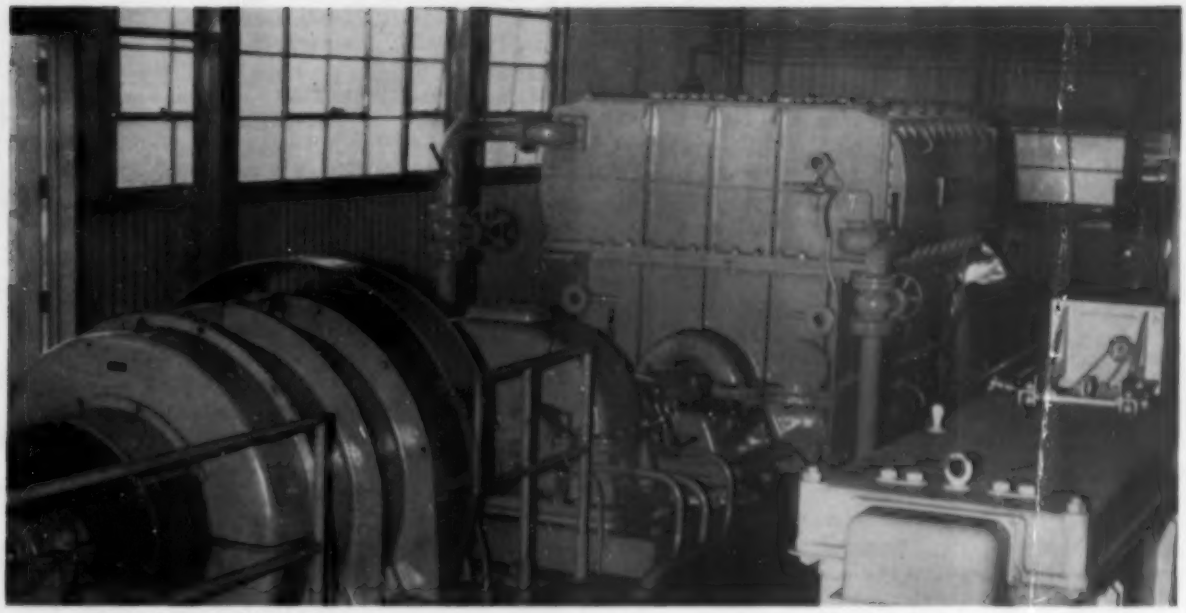
The men were trained where and how to shut off gas, oxygen and acetylene lines; how to drain sprinkler systems; how to plug off open sprinkler heads to stop the flow of water; how to obtain quickly the services of the electrical department to shut down transformer stations and how to ventilate the **area.**

In addition, members were taught how to wear the different types of smoke masks and oxygen-deficiency masks, and how to handle and operate smoke and fume ejectors, flood lights, etc.

(Continued on page 55)

EMERGENCY units of Higgins Inc., New Orleans, La., pulling out in response to an alarm.

TYPICAL class at Higgins, receiving instructions regarding different types of fire extinguishers.



Brown Boveri equipment at the Mississippi Chemical Corporation plant. Motor, gear box, compressor and turbine are shown from left to right.

Mississippi Nitric Acid Plant Applies New Heat Utilization Procedure

Gas Turbine Operates on Waste Heat

By J. D. DRAKE
Chief Process Engineer
Mississippi Chemical Corporation
Yazoo City, Mississippi

DURING the past decade increased attention has been focused upon the high pressure ammonia oxidation process for the production of nitric acid. This interest, originally aroused by the war-time demand for nitric acid for munitions, was further stimulated by the tremendous increase in demand for nitric acid for the rapidly expanding post-war fertilizer industry.

Conventional nitric acid plants using the high pressure ammonia oxidation process employ motor or engine driven reciprocating air compressors for their primary source of air, supplemented by reciprocating recovery air compressors deriving their power from the energy contained in the hot waste gas from the ammonia oxidation process. Such plants are presently in operation at Mississippi Chemical Corporation.

In 1953 the steadily increasing demand for fertilizer grade ammonium nitrate dictated an increase in the production facilities of Mississippi Chemical Corporation. This increase made mandatory a corresponding increase in nitric acid capacity.

Rather than duplicate facilities, it was felt that economy of operation could be achieved by increasing unit capacity and by employing centrifugal air compression rather than reciprocating compression as is normally practiced. Although at the time there were no known American installations employing centrifugal compression and gas turbine power recovery, it was the consensus of opinion that such a combination would prove economically advantageous.

Other advantages of centrifugal compression greatly reduced lubricant consumption and delivery of a non-pulsating, oil-free air stream. The latter features are of particular importance since in the ammonia oxidation process, air stream pulsations must be eliminated and, because it is a catalyst poison, oil must be completely removed.

As a result of an investigation of various makes of centrifugal compressors and gas turbines, the decision was made to employ equipment manufactured by the Brown Boveri Company of Baden, Switzerland. A simultaneous investigation indicated the feasibility of designing an ammonia oxidation plant for the production of 56% acid at a nominal production rate of 120 tons per day (100% acid). Some aspects of the design of this

plant and similar plants were discussed in an article appearing in CHEMICAL ENGINEERING, Vol. 60, No. 11, 1953.

The design finally agreed upon consists of a Brown Boveri "Isotherm" compressor directly connected to a gas turbine on one end and through a reduction gear to a 1600 kw electric motor on the opposite end. Intercooling between compression stages is accomplished by integrally mounted cooling coils. The complete installation includes all necessary starting and electrical control equipment, force feed lubrication and power operated control and safety equipment.

As suggested by the name, the design of the "Isotherm" compressor permits a close approach to isothermal compression. This is accomplished by an arrangement whereby the air is cooled after each stage of compression with the exception of the first and last stages. Altogether, nine stages of compression are employed with seven stages of intercooling. The increase in temperature following the first stage of compression is insufficient to warrant cooling. After-cooling is not required as preheating of the air is necessary in the ammonia oxidation process.

Capacity of the compressor is 18,000 scfm at a discharge pressure of 120 psig and its rated speed of 7200 rpm. At intake conditions of 80F, 100% humidity and using 80F water for intercooling, power requirements for compression amount to 8110 kw.

Hot Waste Gas

Design of the gas turbine is such as to permit the use of 900F waste gas from the ammonia oxidation plant. This temperature is considerably in excess of the temperature permitted in the operation of reciprocating power recovery compressors which are rarely operated above 450F.

The high operating temperature, accordingly, provides increased economy of operation over conventional equipment. When supplied with the optimum quantity of waste gas (67,000 lb/hr) at a temperature of 900F and a pressure of 75 psig, the gas turbine, at its rated speed of 7200 rpm, will develop 2250 kw. Operation of the turbine under conditions involving smaller volumes of waste gas or reduced waste gas temperatures or pressures is entirely feasible. However, a corresponding decrease in power output is experienced.

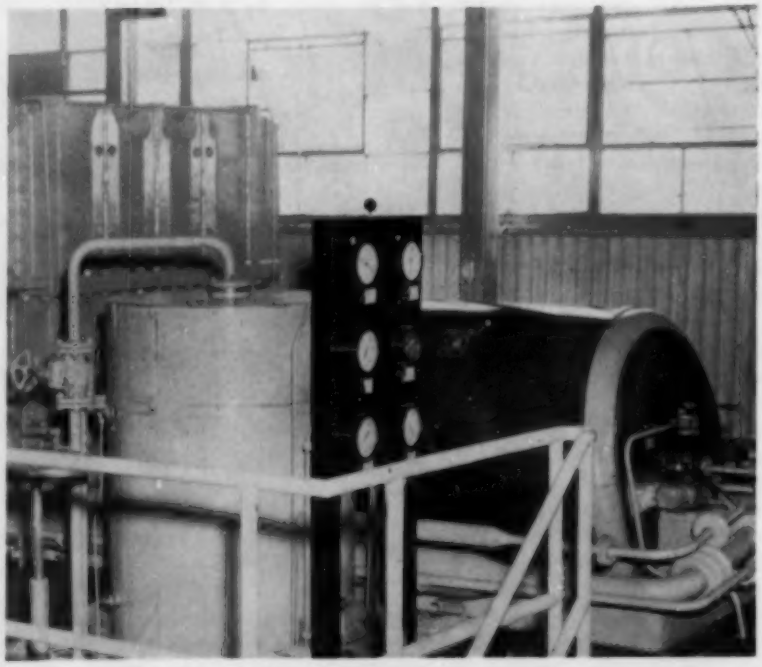
The balance of the power required for compression is furnished by a 1600 kw, 4160 volt, 60 cycle 1200 rpm synchronous induction motor. This motor is of novel design in that its operation is that of an induction motor during the start-up phase of operation, automatically changing to synchronous operation upon attaining normal operating speed. Power from the motor is transmitted through a 7200/1200 rpm gear reducer to the compressor. Power losses in the motor and reduction gear amount to a total of 85 kw.

Operation Procedures

Inasmuch as hot waste gas is available only when the oxidation process is in operation, a combustion chamber is included in the installation to provide hot gas for operation of the turbine during start-up. In practice, the compressor is placed in operation at a reduced rate through the use of the electric motor, suction throttling being employed to prevent overloading. When normal operating speed is reached the combustion chamber is started using natural gas and by-passed air from the compressor.

The hot combustion gases, which are maintained at a temperature of 900F, are fed directly to the gas turbine. As the volume of gas from the combustion chamber is increased additional power becomes available from the turbine permitting a corresponding increase in the output from the compressor. As soon as the compressor discharge pressure reaches 100 psig, the process plant may be placed in operation at a reduced rate.

Waste gas from the process plant is vented to the atmosphere until its temperature reaches the required operating level (700-900F), at which time it may be diverted to the turbine. The quantity of air diverted to the combustion chamber may then be decreased while simultaneously increasing the flow of air to the process. As more waste gas from the process becomes available the output from the tur-



Combustion chamber and auxiliary instrument panel are in the center foreground with the compressor at the left and turbine at right.

Operating Economy an Outstanding Feature

ONE of the outstanding features of the Brown Boveri unit is its economy of operation. Based on a process operating rate of 180 tons per day (100% acid basis) and capacity operation of the compressor, overall power consumption amounts to 426 kwh per ton of acid produced. Of this quantity, 300 kwh are provided by the gas turbine, assuming a power output of 2250 kw, leaving a deficiency of 126 kwh to be provided by the motor.

Compared with conventional equipment employing reciprocating compressors, overall power consumption is only slightly lower. However, power recovery, which amounts to some 70% of the total power requirements, is considerably higher so that actual power costs are substantially decreased.

On the basis of optimum power recovery, it is estimated that a payout time of about four and one-half years would be realized by savings resulting from the use of centrifugal compression and gas turbine power recovery. Savings of this order would appear to amply justify the installation of this type equipment.

bine increases. When capacity operation of the combustion chamber may be discontinued entirely.

Control System

Typical of similar installations, an elaborate control and safety system governs the operation and protects the equipment. Both electric and power oil operated devices are employed. A suction throttling valve installed on the compressor intake controls the quantity of air entering the compressor. During startup this valve is manually operated so that the compressor may be brought up to full capacity without overloading the motor. Under normal operating conditions operation of this valve is automatic. Surging of the machine is guarded against by an anti-surge valve located in a by-pass line between the compressor discharge and the turbine intake. This valve opens automatically if for any reason the surge point is approached.

Protection for the motor is provided by an overload trip and overspeed of the turbine is prevented by inclusion of an automatic valve in the turbine gas inlet line which closes should, for any reason, normal operating speed be exceeded. Further protection is provided the turbine by the inclusion of thermal equipment which operates to shut down the process plant if the temperature of the waste gas entering the turbine exceeds the normal operating level.

On the normal delivery basis of 18,000 cfm, sufficient air is provided by the centrifugal compressor for an acid production rate of 180 tons per day (100% acid basis). Although designed for a production rate of 120 tons per day, it is anticipated that the ammonia oxidation plant can be operated at a rate considerably in excess of design and that a 180 ton per day rate can be approached.

In any event the compressed air piping is so arranged as to permit the diversion of any excess air from the centrifugal compressor to the air system for the existing ammonia oxidation units. This arrangement will permit the operation of any one of the three existing 55 ton per day units independently of its air compression equipment while simultaneously operating the 120 ton per day unit at its design capacity.

Power Output

Although it has been stated that the power output of the expansion turbine amounts to 2250 kw, this value is reached only if the quantity of waste gas from the process corresponds to a production rate of 180 tons per day. Any operating rate below 180 tons per day results in a corresponding decrease in power output of the turbine.

Under such operating conditions the load on the motor would increase (with decreasing acid production rates) until its maximum had been reached. In terms of acid production, this point would be reached at a rate of 144 tons per day, or about 20% above design.

While it is believed that this production rate can be readily achieved and even exceeded, it is not essential to capacity operation of the compressor as it is entirely feasible to divert waste gas from the existing acid units to make up the deficiency resulting from a production rate of less than 180 tons per day on the new unit.

Although provisions will be made for the installation of interconnecting waste gas piping, this installation will not be made unless initial operation of the unit indicates the need.

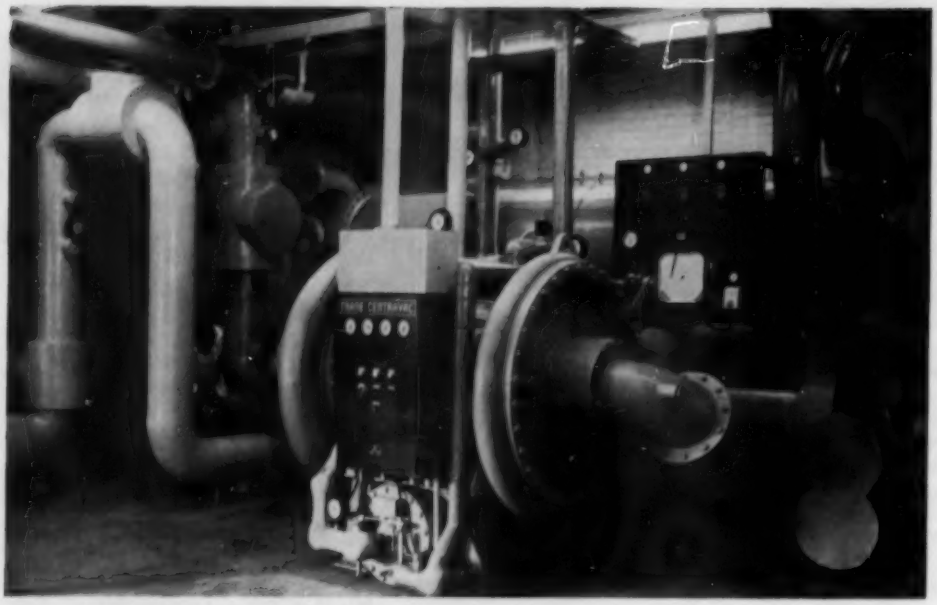
The use of waste gas from existing units for the operation of the turbine would result in a slightly lower turbine power output because of the lower temperature of this gas (about 700 F). However, it is believed that the 2250 kw power output of the turbine can be closely approached even though substantial quantities of the lower temperature waste gas are employed.

Training Fire Fighters

(*Continued from page 52*)

To organize similar groups of firefighters in your plant, great care must be used in selecting the supervisors and squad men. They must be observant, physically fit, quick thinking and have the know how to do things fearlessly and instantly. But no matter how well trained and efficient the industrial firefighters become, they should never hesitate to call the city fire department.

Industrial fire organizations are only auxiliary to the regular fire department and should always function as such. Their primary objective is to hold the fire and keep it from spreading, if they cannot put it out. But they should be so thoroughly and confidently trained that in case of an emergency, when the city fire department might be delayed, they can carry on by themselves.



Refrigeration is supplied by the 300 hp Trane compressor shown here with auxiliary equipment and controls.

North Carolina Mill Air Conditioned

Air Cleaning and Cooling Boosts Efficiency and Improves Product

BLACK or soiled yarn (smoked yarn) in the winter months and excessive heat in summer, necessitating a 20 per cent reduction in operating speeds, induced A. M. Smyre Manufacturing Company to install a completely new air conditioning and refrigerating system in Plant No. 1 at Ranlo, North Carolina.

An estimate of the saving to be effected by the use of the existing air handling, humidifying, and heating equipment was made, and it was found that the cost of adapting the existing system was practically the same as the cost of replacing the entire system.

The engineers selected a central station air circulating system for the card room and five individual stations for spinning and winding operations. DeParx Stimson, Engineers, Winston Salem, North Carolina, studied the problem and recommended and designed the new system which was installed by The Bahnson Company.

Controls used are by Johnson Service Company, refrigeration equipment is by The Trane Company, automatic air filters by American Air Filter Company, and insulated panel apparatus by The Bahnson Company.

Interesting features of this system are: (1) Its adaptation of electrostatic cleaning for reduction of stained yarn. (2) Positive control of both temperature and humidity at any point through such a wide range. (3) Multiplicity of positive zone controls. (4) Control of condensing temperatures through the entire range of the refrigeration machine. (5) 100 per cent automatic control setup for year round conditions either operating or shut down. (6) Air cleaning features, air return feature, and closed-chilled-water circuit all in one compact installation.

The card room is on the first floor level. Therefore, the central station was less expensive to install because a minimum of new building was necessary to house the equipment. Also only half as much air was needed in this area as compared to the spinning and winding areas.

Individual conditioning stations in the spinning and winding areas permit operating continuously even if a conditioning unit should become inactive. Also, this equipment required no major structure for housing, being sheltered in small metal enclosures mounted on

OPERATIONAL HIGHLIGHTS

THE NEW SYSTEM features the following operational advantages:

- Electrostatic cleaning in the spinning and winding areas for the removal of all staining contaminants in the air, resulting in the total elimination of smoked yarn.
- Ability to maintain any inside relative humidity, up to and including 65% rh, without the use of supplementary evaporation or free moisture within the room.
- Automatic filtering of lint and dust from the air before taking it through the conditioning apparatus.
- Positive control of humidity at any point between 40% rh and 65% rh, by the mere adjustment of controls.
- Positive control of temperature (within each zone) at any point between 76 degrees F and 90 degrees F, by the mere adjustment of the controls.
- Positive and complete control of conditions for each block of 12 spinning frames, for the winding area, for the area over cards, for the area over combers and slubbers, for the opener room, and for the picker room.
- Incorporation of an air distribution system suitable for adaptation to a false ceiling.
- Completely automatic refrigerating system, requiring no manual start up or shutdown, and capable of operating satisfactorily at any capacity from 10% to 100% of the capacity of the machine. The condenser circuit on the refrigeration equipment is equipped to enable the cooling tower to operate under any outside conditions. This is made possible by providing minimum tank temperature control, condenser water bypass, and step-control on the operation of the two cooling tower fans.
- Overall control center which determines whether the system is operating on heating or cooling, and enables any one zone to obtain operation of the system in the capacity required.
- Complete three-way modulation of capacity on each of the air washers, with a common pump supplying all water to air washers.
- Three-way modulating of two chilled-water circuits on each conditioner, for positive control of temperature and dehumidifying at any point throughout a wide range of selected conditions.
- Completely closed chilled water circuit, assuring very long operation without need for cleaning of the chiller.
- Shut-down control selector, at each zone, to enable the complete shut-down of the equipment in a given zone when not in operation. This selector brings into play a separate thermostat and humidistat, set to maintain minimum conditions for shut-down periods. When conditions within the zone change to a point beyond the shut-down setting, the instrument affected starts the fan, and brings into play the necessary conditioning components to satisfy the condition in that zone. As soon as the condition is satisfied everything, including the fan in that zone, shuts down.
- Mounting of all top floor equipment on the roof of the mill.
- Insulated-panel construction of all exposed apparatus, eliminating the necessity of housing the equipment.
- Provision of insulated-panel return ducts for the future installation of an under-the-floor return system.
- Inclusion of an emergency control selector for throwing the system over to evaporative cooling in the event of refrigeration failure.
- Since the entire system of controls is automatic, necessary interlocks are provided to prevent the operation of any component when another component, upon which its operation is dependent, is inoperative.

the roof. The cost of this installation was much less than additional central station capacity for the area.

A total of 340 tons of refrigeration is available at 42 degree water temperature to supply both the central station and the individual units in the spinning area.

Air Cleaners

All outside air taken into the system serving the spinning and winding areas is cleaned by electrostatic air cleaners. This feature has stopped trouble with black or sooty yarn.

The American air filters serve as effective lint collectors in the card room and spinning room. These cleaners filter air through a roll of porous paper which automatically winds onto a roller as it becomes clogged or loaded with lint. Working in conjunction with the electrostatic air cleaners, these filters assure clean air in the manufacturing areas, thereby effecting an improvement in cleanliness—and because of this, better quality yarn.

Better Performance

Refrigeration has improved employee morale and comfort in the summer months and has permitted high operating speeds the year around. There is a 20 per cent increase in operating speeds in the summer months now since the usual speed reduction at this time of year are eliminated. Also the work runs much better during the summer months, employees remain in better spirits, and quality and efficiency are much improved on an overall basis.

Card Room Operation

A large fan blows raw air into the card room through paper air filters, through cooling coils, and through ducts into the card room, dampers open to admit air back to the fan for recirculation along with a portion of fresh air.

Spinning Area

In principal, the system in the spinning area works the same way, except that all outside air enters through the electronic air cleaners. Exhaust air from the spinning frame cleaners is also exhausted into the system for recirculation after lint has been filtered out. A total of 41,346 square feet of floor space is air conditioned in this plant.

A Trane Centravac Model 300 compressor operates on 550 volts to cool 1069 gpm of water from 53.3F to 45F, when supplied with 1088 gpm of 85F (entering) condenser water.

The fan for the card room handles 50,000 cfm. There are five fans for the spinning and winding areas. Capacities of these are: 31,200 cfm, 28,900 cfm, 20,700 cfm, 20,700 cfm, 20,700 cfm respectively.

Lone Star Power Plant
Southwestern Gas and Electric Company

PLANNING FOR UNIT INSPECTION

By GEORGE E. MOORE, Maintenance Foreman

JOHN W. TURK, JR., Plant Chief Engineer

THE number one unit of Southwestern Gas and Electric Company, Lone Star Power Plant was put on the line for the first time on March 14, 1954. The unit is a semi-outdoor type. The circulating water pumps, service water pumps, traveling screen, deaerator, evaporator, evaporator preheater, evaporator booster pumps, distilled water tank, and boiler are outside; the turbine and other auxiliaries including a machine shop and storeroom are housed inside a brick structure.

The turbine is a 40,000 kw, 44,000 kw maximum, 3600 rpm tandem compound double flow preferred standard for steam conditions of 850 psig, 900F, and 2½-in. Hg absolute backpressure. The turbine is directly connected to a 40,000 kw, 47,058 kva, .85 power factor, .8 scr, 13,800 volts, 3 phase, 60 cycle, 3600 rpm hydrogen cooled generator with a 250 volt main exciter.

At the present time this unit is the most efficient that the company has in service; therefore, it is very necessary to hold outage time to a minimum. A considerable amount of thought has been given to ways and means of decreasing downtime during the annual unit inspection.

Personnel

Manpower was not a problem. Twenty-four men were employed by the company for the plant. Fifteen of the men are operators, and they are divided into five three-man groups. Each group or watch consists of a watch engineer, a turbine operator, and a fireman. Four watches are regularly scheduled operating shifts; the fifth watch, designated as "X" watch, work maintenance four days a week and act as the relief watch on operation one day a week.

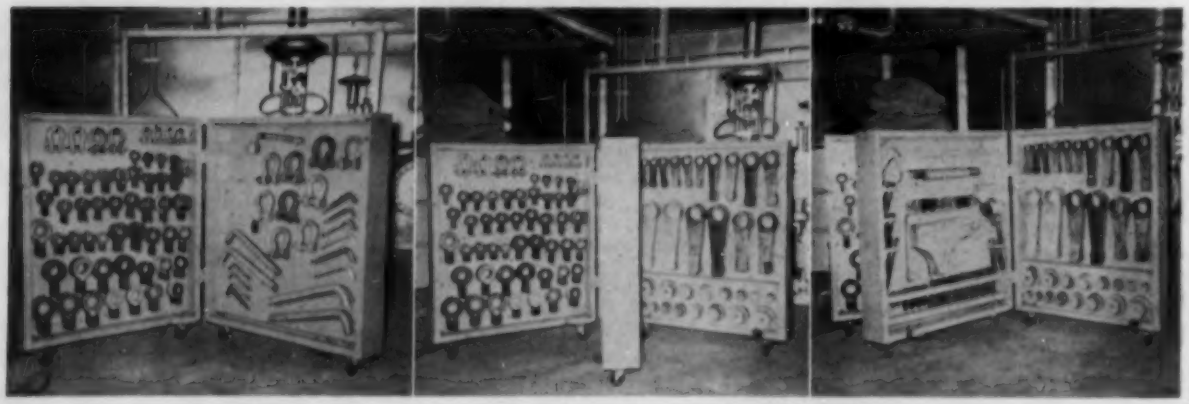
During unit inspection when the plant is down all operators, with the exception of the four operating watch engineers, are transferred to the maintenance watch. Also, there are two maintenance men, an instrument man, and an electrician. These make a total of fifteen men available to work on the unit. The supervisory personnel consists of the maintenance foreman, plant chief engineer, and a service engineer from General Electric Company.

Tools and Equipment

The main problems were to have the correct tools for the job, and to cut down on lost motion in the handling of tools, equipment, and disassembled parts of the turbine.

The maintenance foreman and plant chief engineer were stationed at the plant during the construction. During this time they made a list of special power tools, wrenches, sockets, etc., that would be economically justified. These tools were purchased. A set of hand tools was purchased for each maintenance man, the instrument man, the electrician, and the "X" watch. A machine shop consisting of a bench lathe, a 16 in. x 102 in. lathe, a drill press, a pedestal grinder, an arc welder, and an acetylene welding outfit was set up. When these purchases were completed it was believed

Fig. 1. Three views of portable box for special turbine tools.



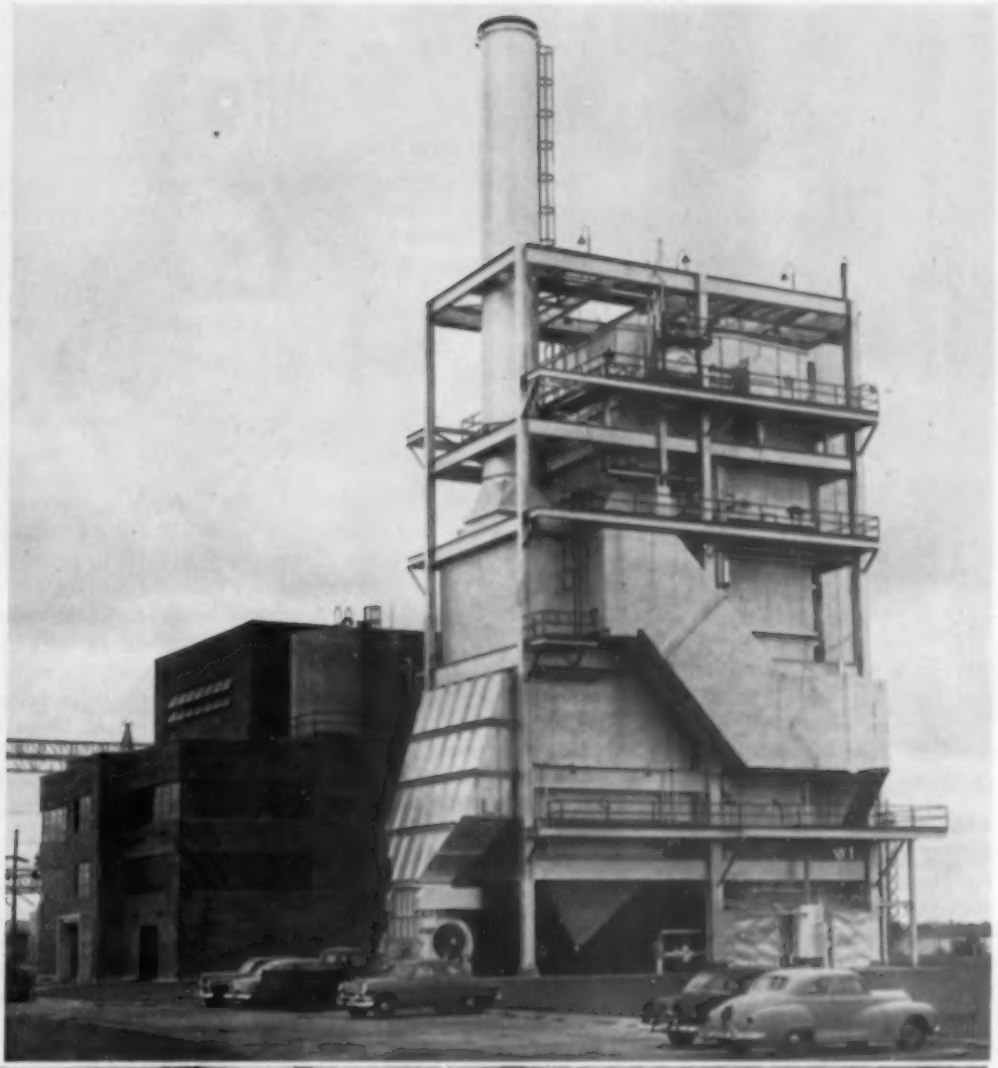


Fig. 2. View of power plant showing outdoor boiler

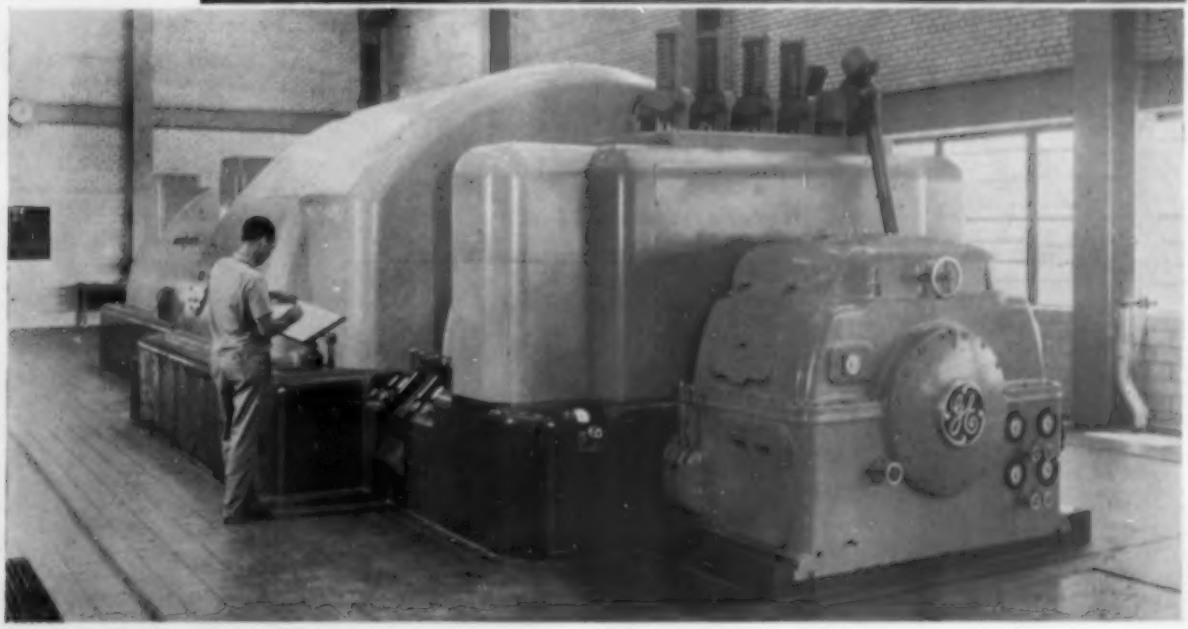


Fig. 3. The inspection is complete and the turbine is ready for operation

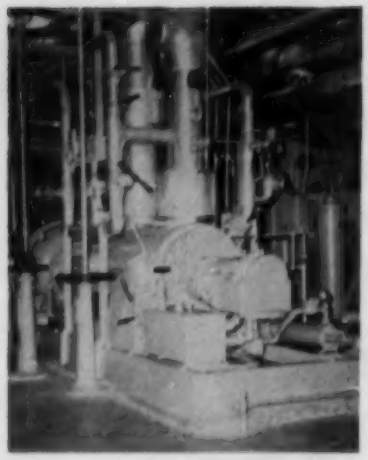


Fig. 4. Boiler feed pump.

that the correct tools were on the job.

Cut Lost Motion

Now the problem was to plan and cut down on lost motion. The first thought was to get the tools into such a condition that they could be used efficiently.

Special Tools

Quite a number of special turbine tools had been furnished. For these an upright, two section box on casters was constructed with places for each of the wrenches, sockets, jack bolts, etc., as shown in the accompanying photographs. Position of the tools were outlined as necessary to facilitate the replacement of the tools in the proper place.

General Tools

Next the general tools were placed on an inclined board 4 ft x 8 ft and were also outlined in red paint for proper placement. Eyes were put at the corners for lifting to the turbine room floor.

To prevent hand tools from two sets becoming mixed, each set was banded with a different color paint. The handboxes were also identified with the same color.

Lifting Equipment

A rack was made that could be clamped between two columns on the turbine room floor for holding the lifting cables, wirerope slings, and hoists. This rack is also used for the storage of the same cables and hoists in the store room at other times.

Five wooden bolt bins were made with each bin labeled as to the position from which the bolts had been removed.

For safety, protection of the lower shell joints, and to prevent foreign objects being lost in the extraction passage or dropped on the condenser tubes, special plywood covers were provided. One-quarter plywood was used to cover the high pressure horizontal joints, and three-quarter plywood was used to cover the low pressure end outside of the diaphragm area.

A wooden cupboard approximately 6 ft high, 4 ft wide, and 2 ft deep was constructed for all miscellaneous supplies.

A wooden work bench 4 ft x 10 ft, with a shelf underneath, was constructed and a small vise and bench grinder were mounted on this bench.

Supports and Stands

On a flat car, which was available, stands were mounted on which the turbine rotor could be placed for sandblasting if this proved to be necessary.

To prevent the crane being tied up for long periods, four steel stands 26 in. high were made for each of the turbine upper shells. Boards were bolted to the top and bottom of these stands, with the bolt heads countersunk, to prevent damage to the tile floor and to the shell joints.

With the shells sitting on these stands the joints could be cleaned except for the portion over the stands. Therefore, the crane would have to hold the shells suspended only long enough to clean those

(Continued on page 63)

Fig. 5. Rack for general tools.

Fig. 6. Rack for lifting equipment.

ABOVE—Operator at control panel sets draws as paper is brought over for change in grade.

RIGHT—Operator checks "couch" d-c panel with preamplifier in foreground.

Electrical Maintenance at St. Regis

By C. W. WRIGHT
Jacksonville, Florida

Electricians in this Jacksonville, Florida, paper mill go to school to learn how to handle new electronic control equipment.

PUSHBUTTON control and electronic operation, long talked of as the ultimate objective in manufacturing processes of many types, have been carried out to a high degree in the new pulp and paper mill of the St. Regis Paper Co., at Jacksonville, Fla. More complex than conventional electric controls, these call for a carefully planned preventive maintenance program which is accomplished by the company's own specially trained crew of 16 under the direction of Lester M. Kapp, electrical superintendent.

The St. Regis mill requires the services of two men on each shift, aided by intricate and accurate testing devices of the latest types for constant checking of equipment and voltage.

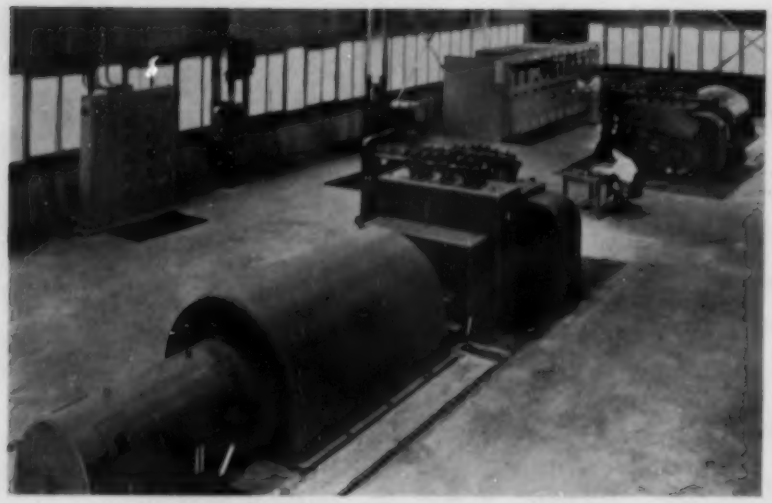
Package Installation

A complete electrical system, engineered as a unit, was installed in the plant from the woodyard to finishing room by the General Electric Co., whose experts also worked with the St. Regis staff in the training of a maintenance crew. If replacements on this crew are required, a journeyman electrician is usually the best qualified candidate, but even he will require special training.

Training on the job has been found effective at St. Regis, provided it is supplemented by outside study. An electrician teams up with an electronics man to learn the practical workings of the maintenance job, but he is encouraged to take night courses in electronics at the Jacksonville School of Technology.

Electric power generating equipment consists of two 6,000 kw, 4,160-volt a-c, .80 pf turbogenerators and the electric feeder distribution switchgear. Each unit is designed for operation with steam at 625 lb gauge and 825 F, but actual operation has been at 750 F total temperature.

One unit is provided with a 9,500 sq ft surface condenser, and is arranged for extraction of steam at 65 psi gauge. The other unit is arranged for extraction at 165 psi



Two 6,000-kw, 4,160-volt a-c, .80 pf, turbo-generators, and the electric feeder distribution switchgear.

Substation showing motor generators, amplidyne generator, 440-volt distribution in left foreground and 440-volt load center at right. At right rear are cubicles for dry-end control of paper machine drives.

gauge and exhausts at a back pressure of 65 psi.

Electric power is transmitted at 4,160 volts through feeders to the 4,160-volt motors (200 hp and above) and to several 1,000 and 750 kva transformer power centers located in the mill, from which the 440-volt distribution feeders are run to the various motor and lighting centers.

Paper Machine Operation

The heart of a kraft paper mill, of course, is the paper machine, and it is here that electronic controls have been worked out to the finest point.

The paper machine, built by the Beloit Iron Works, consists of four sections totaling 71 paper dryers and 18 felt dryers, with a four-drinier wire 230 inches wide and 120 feet long. To maintain desired paper tension, these rolls must be operated synchronously, but each section is controlled by one motor and generator. Thus they are tied in electrically but not mechanically, all synchronizing being done by electric preamplifiers.

With Amplidyne control the paper machine can be operated at speeds varying from 350 to 2,000 feet a minute, and 1,850 feet per minute has been reached in actual practice.

While the electronic components are designed to give trouble-free performance, no such complex devices can be expected to function perfectly without preventive maintenance properly applied.

Maintenance

The St. Regis maintenance crew, under the direction of Mr. Kapp, has been carefully trained to catch trouble when it is brewing and before it occurs. Each man has a routine to follow and makes periodic reports of his findings. Keeping contacts clean is a primary requirement.

Electronic tube analysis is one of the most important phases of preventive maintenance. A card record is kept to indicate any abrupt change in tube characteristics so that replacements can be made before there is any failure.

Whenever the output of a tube drops below normal, there is an immediate replacement. Standard radio tubes of sturdy construction, designed for industrial use, give long, trouble-free service, but they are nevertheless checked with regularity.

Amplifier tubes used in the St. Regis installation are of the high vacuum "hard" type which can be checked readily in a tube tester and their expected life predicted, thus reducing uncertainty.

Voltage Change

The sectional drive, with electronic Amplidyne speed control, is designed to minimize the effects of voltage changes should they occur. Each section is a complete, independent power unit, with generator, motor, speed detector, electronic amplifier, Amplidyne control panel and operator's cabinet.

This electronic combination is said to be accurate in holding draws, fast in response, adaptable in controlling tension and speed, easy for machine tenders to operate and takes little space around the machine.

The speed detector, which is the heart of the electronic control system, is a small d-c tachometer gen-

erator, totally enclosed, which is directly coupled to the motor shaft or to the high speed pinion of the reduction gear. It monitors speed at all times, and transmits this intelligence to the electronic control.

The Amplidyne is a small rotating machine used to excite the field of the generator. It is similar in appearance to a d-c exciter with its rotor, stator, commutator and brushes. But it is capable of greater power amplification and much faster response. The electronic amplifier is a d-c amplifier for supplying field excitation to the Amplidyne.

Speed Adjustment

With the sectional controls, paper machine speeds can be adjusted smoothly over a wide range. If a change is to be made in the speed of the entire machine, it can be done slowly so that paper quality is not affected by the speed transition.

In addition to the electronic controls for normal operations, there are emergency controls, electrically or electronically operated. For example, oiling is done electrically and hydraulically. If oil flow ceases for any reason, a horn is electrically set off as a warning signal. An overload on a drive motor immediately turns on a red light. In case of fire, ventilating fans, electrically controlled, are automatically shut off. Electrically controlled fire sirens give the location of the fire.

Emergency Protection

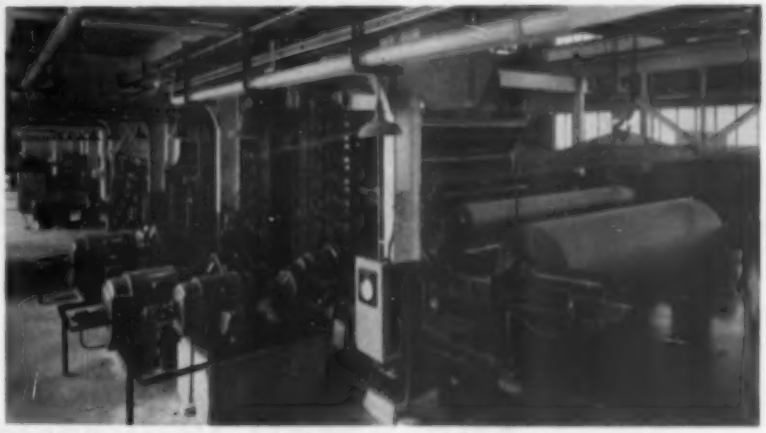
Serious emergencies have been few and have been caused mainly by external influences such as lightning or high winds.

Before lightning protection had been completed, there were three outages. With proper grounding and sheathing, this trouble may have been eliminated. Every pole is now grounded with not more than five ohms resistance at each point. A high degree of protection has been afforded by the use of lightning arresters which will bypass a voltage surge and allow it to go to ground, with voltage being quickly restored to normal.

In the event of power failure, the plant has an emergency diesel generator for stand-by power for starting up auxiliaries.

Throughout the entire mill, electrical or electronic activation and controls are used—even to the opening and closing of some machine room doors. With the immense amount of electronically-operated equipment, controls are more complicated than in older methods of operation, but maintenance is less complicated. Modern instrumentation for testing simplifies many procedures.

Electrical equipment associated with the electrical precipitator.



Back end of paper machine showing sectional drive motors.

Planning for Inspection

(*Continued from page* 60)

small portions. Also these stands hold the shells high enough for a visual inspection of the inner parts.

Routine

During inspection, at the end of the day (and at noon if necessary) all tools were placed in their proper places, and were ready for the next day's work.

Prior to inspection all tools were taken to the turbine room, 30-lb roofing felt was placed over all grating in the floor to prevent dropping anything through, and clear spaces were covered with boards to protect the floor from the placement of turbine parts.

Briefing

Prior to the inspection classes were held, and the men were given a general outline of the work that was to take place. During the inspection, every afternoon each man was told the work that he would be expected to do on the following day.

The unit inspection was completed in 11 working days.

Firing aisle showing forced draft fans mounted on stoker, coal handling equipment above stoker hoppers, and end view of instrument panel.

Firing aisle, opposite view, and at elevation above coal handling equipment. Stoker coal conveyor at left—instrument panel in right foreground.

TYPICAL DESIGN for The Small Industrial Steam Plant

BASIC conditions and questions which must be considered during design of a small steam plant, are discussed in this paper which was presented at the Annual Meeting of the American Society of Mechanical Engineers in New York. A specific project is described and the resulting conclusions which influenced the design are presented.

By GEORGE R. MORGAN
Partner and Department Head
J. E. Sirrine Company, Engineers
Greenville, South Carolina

TO ESTABLISH a proper level of thinking for this discussion, the word "Industrial" in the title is defined as a "Productive Enterprise." A "Small Sized" steam plant is defined as one which has a nominal average steam production rate in the order of 10,000 pounds per hour to 30,000 pounds per hour saturated steam at pressure ranges between 100 psig and 250 psig.

Before an engineer can begin the design of any steam plant, there are a number of factors to be considered and a number of questions that must be answered. There is no standard design for the small industrial steam plant because the requirements and conditions of each project vary. Hence an engineering study is required for each project.

Rather than discuss in detail basic conditions and questions, a specific project has been selected for analysis. Thus the basic considerations and conclusions will be exemplified.

The selected project is the new steam generating plant for a 540 bed general hospital located in Greenville, South Carolina.

Immediately the question arises as to how a hospital plant would qualify for the discussion of a small sized industrial steam plant. A "Productive Enterprise" in general requires steam not only for space heating, but also to furnish heat energy for its various processes as required.

Such process uses of steam vary both in quantity and time within the individual process, as well as in relation to other processes required by the end product. These requirements then result in a variable demand of steam not only from hour to hour but from day to day in accordance with the volume of business and with changes in weather.

There are many uses of steam in a general hospital which make for a variable demand on its steam plant: Comfort heating, sterilizers, kitchen, water heating, laundry, etc., each affected by the season of the year, the patient load, and the types of medical treatment given.

Adding all of the steam re-

quirements together with respect to their various schedules, results in a variable demand of steam from hour to hour, and from day to day. Therefore the steam plant for a hospital requires similar characteristics to that of a steam plant for a textile mill dye plant, a paper mill, and other types of manufacturing plants.

The hospital governing authorities authorized an expansion program and commissioned Samuel Hannaford & Sons, Architects of Cincinnati, Ohio, to prepare the plans. The approved plans expanded the hospital to its present capacity of 540 beds and also provided for future expansion. The new plans necessitated a relocation and enlargement of the boiler plant and laundry, and J. E. Sirrine Company, Engineers, Greenville, South Carolina, were commissioned to prepare plans for a new steam generating plant and a building to house it and the laundry.

Basic Conditions

Basic conditions and questions as applied to the design study for the hospital steam plant are listed herewith but not necessarily in order of importance.

Plant Steam Load. Total maximum demand for steam as represented by all connected facilities, not including boiler plant auxiliaries, was estimated to be 45,000 pounds per hour in winter and 27,000 pounds per hour in summer, while the average demand was estimated to be 50% of the maximum. The laundry and kitchen represented about 20% of the maximum; the sterilizers and domestic hot water heating represented about 40% of the maximum; and the building heating represented the remaining 40% of the maximum. It was further determined that there would be several hours after midnight when the demand for steam would be very low, the laundry and kitchen being inoperative, and the sterilizers and domestic hot water requirements being reduced. A low average demand for this period of 5,000 pounds per hour in summer was used in selecting the fuel burning equipment.

Continuity of Supply. For a hospital it is imperative that sufficient steam be always available for building heating, sterilizer use, and domestic hot water heating. It is not so imperative for the kitchen and laundry, since if necessary these two functions can be supplied from business establishments in the hospital city. Therefore all steam plant equipment selection must be such that emergency failure of any one function can be offset by some substitute method to insure continuity of steam supply to the essential uses. The quantity and unit capacity of boilers selected was such that a spare unit would always be available.

Fuel Selection. An economic study of fuel costs, labor costs, fixed charges on equipment required, and availability of fuel, determined the use of bituminous coal.

Local Regulations. Local restrictions and regulations consisted only of a reasonable smoke abatement law, and regulations regarding chimney height as controlled by the nearest airport elevation and location.

Low Investment Cost. Hospital authorities were anxious to provide maximum patient capacity possible within the allocated funds, and therefore were more interested in a low initial investment than in the lowest annual cost.

Location. Hospital expansion plans included the space occupied by the old boiler plant. Therefore the new boiler plant had to be located elsewhere and be in operation be-

View of boiler feed pumps from elevated position. Motor driven pump in front. Feedwater heater panel on left.

Rear aisle behind induced draft fans showing damper control drives and fans discharge to breeching overhead.

fore construction of the new hospital could begin. The site selected placed the end of the boiler room close to the property line, and the opposite, or laundry end of the building within reasonable distance from the main service area of the hospital. Steam lines to the hospital were installed in a tunnel that connects the adjacent laundry to the hospital.

Future Expansion. The building design and equipment location will allow for such an expansion.

Personnel. Licensed operators are not required by law and the available operating personnel would be of at least high school intelligence, but without much experience in boiler room operation. This dictated a simple design, and as near fool-proof as possible so that continuity of steam supply could be had in spite of simple emergencies or equipment breakdown.

Maintenance facilities. The hospital does not have a mechanical repair shop and is dependent on such enterprises in the city. Equipment selection was based on periodic maintenance requirement of a nature that could be performed by the boiler plant operator without outside help.

Operation Simplified

In view of foregoing conclusions, simple automatic combustion control was selected based on maintaining a near constant steam pressure in the header, a fixed fuel-air ratio adjusted for a predetermined CO_2 in the boiler outlet gases, and with a predetermined overfire draft maintained. All of these controls were arranged so that optional hand operation could be had in lieu of automatic operation. Automatic coal feed from coal storage silo to stoker hoppers is controlled by demand for fuel in the hopper. Ash removal is by hand from the ash pit.

The city water used for make-up has very little hardness and does not require softening. Make-up water and condensate are mixed in the condensate tank, a constant water level being automatically maintained in the tank. Phosphate is fed into the mixture of condensate and make-up water at a controlled rate ahead of the deaerating heater. Between the deaerating heater and the boiler feed pump, sulphite is fed into the water at a controlled rate. Simple tests are made and recorded daily and this is checked periodically by a boiler water consultant. Recent inspections of the boiler internals show them to be in excellent conditions.

Construction Procedures

As stated before, it was necessary for the new boiler plant to be in operation before hospital construction could begin. Brief limiting specifications were issued for the boilers and stokers and these were purchased by the owner, with a separate contract for erection. These being the items requiring the longest delivery time, all steps possible were taken to expedite them.

Using the method of owner purchasing principal equipment items, and then including the erection of each in one or more contracts, saved considerable time, with close coordination between the several contractors being maintained by the engineers. For instance the piping contractor installed the pumps, the feedwater heater, the chemical feeders, the combustion control equipment, and other such items. The boiler erection contractor also erected the stokers, the fans, and the boiler settings.

The owner had no preference for any particular manufacturer, and therefore competitive prices were obtained.

EQUIPMENT DESCRIPTION

Specifications for equipment were based on the foregoing basic conditions and considerations.

Boilers

Three boilers were specified, each to be two-drum water tube type, with front and side wall cooling, with steel encased refractory and insulation setting. A boiler of this type steams rapidly, is reasonable in height, easy to clean and repair, and with water cooled furnace requires little refractory maintenance. This is a standard type with manufacturers and was subject to quick delivery.

The boilers were selected to generate 16,000 pounds of steam per hour with two-hour peak rating of 19,000 pounds per hour at not more than 200% rating when operating at 125 psig saturated, and 220 F feedwater.

The nearest standard size to these requirements as manufactured by Combustion Engineering, Inc., was selected on competitive bids. Each had 2875 sq ft of heating surface, rated at 16,000 pounds of steam per hour continuous at specified pressure and feedwater temperature when operated at 13.5% CO_2 in boiler outlet. The exit gas temperature to be 575 F and an efficiency of 76.5%, based on 13,500 Btu per pound bituminous coal.

The maximum winter demand of 45,000 pounds per hour, with 50% load factor, results in a steam demand that can be easily supplied by two boilers, leaving the third as a spare. Should a most unusual condition arise with two boilers being inoperative at the same time, the third boiler could supply the steam demand providing the kitchen and laundry operations be "farmed out" to city firms.

In summer one boiler comfortably supplies the steam demand, one stands by ready for emergency use, and the third is available for overhaul. In the summer, all three units are put in first class operating condition before the beginning of the heating season.

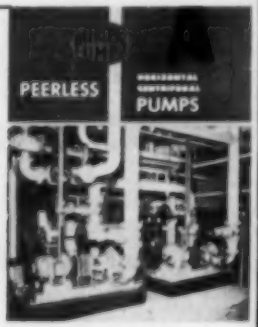
Stokers

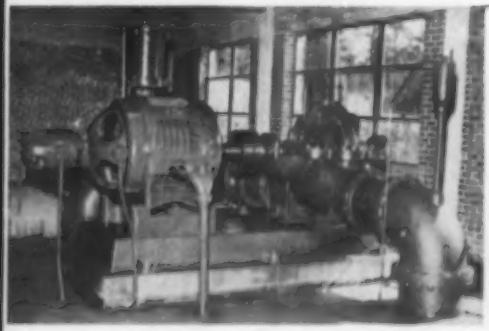
It was recognized that spreader stokers are well adapted to rapid changes of load, that they burn satisfactorily a wide variety of coals, and operate at reasonably high efficiency. On the other hand, they are not well adapted to operation at low loads sustained for several hours, unless a high grade experienced fireman is in charge of the plant. Spreader stokers also create a fly ash problem that requires the installation of a dust collector in the boiler gas circuit, thus adding to the investment cost. The engineers therefore specified a single retort under-

look AT THE PUMPING PROBLEM *two ways*

VERTICAL

Ho Rizontal





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feed stoker with steam dump plates as being the type best suited to meet the conditions and requirements of the plant.

The stokers installed are Combustion Engineering, Inc., type E, electric motor driven, with integral forced draft fan, inlet valve controlled, having a projected grate area of 62.4 sq ft. No air heaters are provided.

Chimney and Fans

Even though the draft loss through the boilers, flues, and breeching would be reasonably low, calculations resulted in a required chimney height for natural draft, with the ultimate boiler installation, of more than 150 feet above ground. For such height the chimney would have to be painted and illuminated to meet C.A.A. regulations.

By using an induced draft fan for each boiler the chimney height selected was designed to discharge gases at an elevation above the top floor of the hospital. The chimney was constructed of red radial brick by Custodis Construction Company, 130 feet high, and 5 feet 6 inches internal top diameter.

The induced draft fans were furnished with the boilers, one for each, and are Clarage single width, single inlet, electric motor driven at 720 rpm with outlet damper controlled from furnace draft.

Feedwater Equipment

The vertical type deaerating feedwater heater with vent condenser and stainless steel trays was manufactured by Elliott Company, and has a capacity of 60,000 pounds per hour.

Four dial thermometers indicate temperatures at inlet and outlet of vent condenser, and temperature of steam space and water storage space of the heater. These thermometers were mounted on an instrument board on the operating floor, together with pressure gauges and a Yarway level indicator. The heater was mounted on a platform 18 feet above the operating floor.

Two boiler feed pumps were specified, to be duplicates, with one driven by an electric motor, and the other by a steam turbine. Each pump has a capacity of 38,000 pounds per hour and except during unusual extra heavy steam demand conditions, one pump only is in operation.

The turbine is supplied with steam at boiler pressure and discharges into the deaerating feedwater heater at from 3 psig to 5 psig, throttle steam being controlled by a Copes regulator actuated from steam header pressure.

The motor driven pump discharge is controlled by a Copes excess pressure regulator adjusted to maintain a fixed differential pressure between pump discharge pressure and boiler feed header pressure.

Each boiler is equipped with a Copes Flowmatic feedwater regulator, with the thermostat at boiler water line and the control valve four feet above operating floor, having a hand controlled bypass valve at the same level. Normally the turbine driven pump is operated so that the exhaust steam will be supplied to the deaerating heater. However, under very low summer loads the turbine exhaust steam exceeds feedwater heating needs. Under this condition the motor driven pump is used, and steam from the header is supplied to the deaerating feedwater heater through a Spence pressure reducing valve set for desired heater pressure.

The pumps were manufactured by Buffalo Pumps, Inc., with the turbine being manufactured by Elliott Company.

The 720-gallon condensate collecting tank is located in the tunnel. It is mounted on steel framework about five feet above the floor.

City water make-up piping is connected through a Fisher float cage and water control valve set to maintain a desired level in the tank. The tank is vented to atmosphere, no attempt being made to use the heat in the flash steam from the vent.

Two motor driven Buffalo centrifugal pumps (one a spare) are floor mounted directly under the tank and deliver condensate to the deaerating feedwater heater through the heater regulating valve, which maintains a constant water level in the heater. Should both pumps become inoperative at the same time, city water is supplied to the deaerating heater through a hand valve.

Steam Header

All boiler steam leads connect to a prefabricated 10-inch steam header 14 feet long mounted on concrete pedestals with header center line 3 feet above the operating floor. Connecting to the header is one line supplying the hospital heating and other steam uses, one line to the laundry, and one line for boiler plant auxiliaries, and direct supply to deaerating feedwater heater. Two blanked nozzles are on the header for future use.

In each pipe line connected to the header there is installed a full sized gate valve with horizontal stem about five feet above the floor, making for easy operation of wheel handle. Each valve has a small globe valve controlled bypass line around it to equalize pressure for opening of gate valve. The header is drained through an inverted bucket trap discharging direct to the steam space of the deaerating feedwater heater.

Combustion Control

Bailey Meter Company controls are supplied with instruments mounted on a steel panel located in front of the middle boiler.

The instruments consist of: (a) One master recorder-controller to record header steam pressure and boiler feedwater temperature; (b) Three boiler meters, one for each boiler, each to indicate, record, and integrate steam flow and to record relative air flow based on setting for desired CO_2 in boiler outlet gas. This meter also records the temperature of the boiler outlet gas. (c) Multipointer draft gauge, one for each boiler, to indicate pressure of primary or stoker windbox air, furnace draft, and induced draft fan inlet gas pressure. (d) Manual-automatic selector valves controlling fuel feed to stokers, one for each stoker. (e) Manual-automatic selector valves for controlling forced draft fan inlet vanes, one for each stoker.

A service engineer from Bailey

Hudson saves $480,000 a year burning coal the modern way

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Today, steam at Hudson is supplied by three new boilers instead of ten old ones. Other new equipment includes a coal-handling system, automatic combustion controls and automatic ash disposal system. Manpower needs in the boiler area have been cut from 14 to 10 and in the compressor area from 8 to 6. With a reliable power supply, Hudson is protected from service interruptions. And the reduced cost of operation resulting from the new equipment will pay off the original investment in six years, leaving an annual saving of $480,000 thereafter!

Investigate Your Fuel Costs

If you're planning to modernize your plant or build a new one—or if you are just interested in cutting fuel costs—find out how coal, burned the modern way, compares to other fuels. Why not talk to a consulting engineer or your nearest coal distributor. Their advice may save you thousands of dollars each year.

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Meter Company visits the plant about once each year, examines the equipment, and adjusts and calibrates each item. The records obtained have been very useful, not only to the operating personnel, but to the engineers who check operations from time to time.

Coal Handling

All fuel must be delivered by truck; therefore a reasonably large storage was indicated to assure ample fuel supply during inclement weather. A coal silo 16 feet diameter by 50 feet high was selected, having its live storage shelf installed at proper height to discharge coal to stoker feed equipment by gravity. This live storage compartment has a capacity of 75 tons, with the entire silo capacity being 190 tons.

The silo is constructed of precast concrete staves with wrought iron hoops and with flat concrete roof, and was furnished and installed by Neff & Fry Company. Fuel is discharged from a truck into a pit depressed in the ground, from whence it is conveyed to the top of the silo by a bucket elevator.

An opening is located near the bottom of the silo so that coal in the area under the live storage shelf can be conveyed to the top by the elevator. The receiving pit is covered with a grid to eliminate large lumps of coal, and in addition has a weather-tight metal cover.

Coal is discharged by gravity from the upper or live storage section of the silo to an enclosed drag bar conveyor installed over the stoker hoppers, with discharge openings to each hopper. The entire conveyor is enclosed to eliminate dust nuisance.

One high mounted, and one low mounted Bin-Dicator installed in each stoker hopper, connected electrically to the drag-bar conveyor motor accomplish automatic delivery of fuel to each hopper. When any one hopper's coal supply falls to the low Bin-Dicator the conveyor becomes operative and continues to operate until all high mounted Bin-Dicators are satisfied.

An overflow connection from the end of the conveyor to a small outdoor storage bin provides for excess carry-over of coal. The carry-over is negligible and the bin is emptied at periodic intervals.

The plant operator or fireman is not required to constantly observe stoker fuel demand during normal operation and can therefore devote sufficient time obtaining proper combustion, and performing daily maintenance items.

Coal handling equipment was furnished by Continental Gin Company of Birmingham, Alabama.

Boiler Plant Space

The boiler plant end of the building measures 70 feet long by 45 feet wide, with concrete floor directly on earth. The gable roof is supported on steel trusses with side walls 26 feet high and the rise of the truss is 8 feet.

Located against the dividing wall between the boiler plant and the laundry are the steam header and boiler feed pumps, with deaerating feedwater heater directly above pumps. Roberts chemical feeders are also located against this wall.

The centerline of No. 1 boiler is 19 feet 6 inches from the dividing wall, with 18 feet 6 inches centerline distance between boilers. This results in an 8 foot aisle between boilers, making for ease in cleaning and operating.

Boiler fronts are on a line 12 feet from the front wall of the building, which allows ample room for dragging ashes from each pit. Induced draft fans are directly behind each boiler with ample walking room between the fan and the boiler. The breeching is supported overhead from the bottom chord of the trusses.

Insulation

Eighty-five per cent magnesia is used to insulate steam lines, induced draft fan up to outlet damper, steam header, deaerating feedwater heater, feedwater piping, and condensate collecting tank.

Emergency Power

Installed in a small room adjacent to the boiler room is a gasoline engine driven alternating current generator of 75 kw capacity. This unit is push button started and is for the purpose of supplying electric power to boiler plant equipment when failure occurs in the public utility power system. Thus steam supply will not be interrupted, a situation that must not exist in a hospital.

Plant Cost

The total cost of all equipment in place, electric wiring and motor controls, boiler room building cost, and engineering, was $4.70 per pound of steam generating capacity installed.

Operation

The boiler plant has been in regular operation about three years, and a recent examination of records indicates an average annual fuel burning efficiency of 70%. During this period hospital steam demands have been fully met, with no interruption of steam supply. All maintenance requirements have been handled by the operators without outside assistance.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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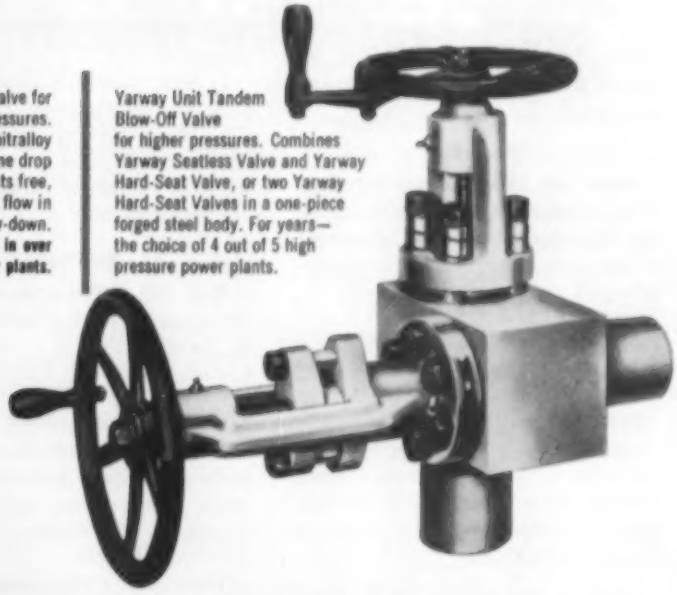

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Atomic Energy Developments

By JOHN F. LEE*
Consultant on Atomics
for Southern Power & Industry

Readers of occasional reports may not readily realize how fast the practical use of atomic energy is advancing, unless the many activities are considered collectively. Here the author summarizes recent advances and points out total progress.

ATOMIC energy developments have hit a fast pace in recent months with such revelations as the shakedown cruise of the submarine *Nautilus*, plans for an atomic powered bomber fleet, Congressional surveys into the state and growth of the atomic energy industry, a nuclear engineering congress in Cleveland, a meeting of bankers for the purpose of exploring the financing of the atomic industry—and surprisingly enough an offer from the Russians to report on their atomic power plant. The course of these developments should give a clear indication of where the atomic energy industry is headed.

Nautilus

Much of the detailed information on the *Nautilus* trials is classified for obvious reasons. However, it has been stated that this atomic-powered submarine cruised for seven days and ranged over a distance of 1000 miles. During the trial run the *Nautilus* dived fifty times and was propelled for a total of 148 hours on nuclear power. Approximately 50 hours were spent in surface operations. Navy officials were pleased with the test results which apparently lived up to all expectations.

Survey

The Joint Congressional Committee on Atomic Energy has plans for a comprehensive survey of the development, growth and state of the atomic energy industry. Among the main points covered in the survey are:

a. The demonstration power program and the five-year reactor development program.

b. Pricing policy of the AEC.

c. The atomic energy act as it concerns peacetime applications of atomic energy.

d. Licensing procedures and regulations.

e. Policy on control and dissemination of atomic energy information.

f. Possible problems which could hamper industrial participation in atomic energy.

g. AEC patent policy and compulsory licensing requirements.

h. Plans for training engineers and scientists, and

i. The domestic uranium mining industry.

Bombers

The Air Force announced some time ago through General Nathan F. Twining that it is planning an atomic - powered intercontinental bombing fleet. Although a number of difficult engineering problems remain to be solved General Twining stated that advances already made permit the projection of practical application of atomic powered aircraft.

The Air Force announcement was given strong support in another announcement made by Dr. Jerome C. Hunsaker of the National Advisory Committee for Aeronautics. According to Dr. Hunsaker, an M. I. T. professor, the research effort of the NACA promises non - stop supersonic flight to any point on the face of the earth and return.

Engineering Congress

The Engineers Joint Council has announced plans for a Nuclear Congress and Atomic Exposition to be held in Cleveland, December 12 to 17. The Cleveland Congress will follow the closed conference to be held in Geneva, Switzerland, late this summer under the auspices of the U.N.

The Congress in Cleveland will be open to all and will present a wealth of declassified information including data declassified as a result of the Geneva Conference. The exposition to be held in conjunction with the Cleveland Congress will offer exhibits showing the industrial, technical and scientific potential of atomic energy. The theme of the Congress and Exposition will be the industrial applications of atomic energy.

Financing

The New York State Bankers Association met on January 24 to learn about the future of atomic energy and how it will affect bank financing. The bankers were told

(*Continued on page 74*)

* Mr. Lee is Professor of Mechanical Engineering, North Carolina State College, Raleigh, N. C. He will lecture at Cambridge University this summer; and while in England will visit the Harwell Atomic Energy Establishment. He also expects to meet with several European power specialists.

"No trouble holding vacuum with these traps"

"They certainly are an easy trap to maintain. We haven't done a thing to them yet—and no more trouble holding vacuum", says Joseph Vermuelen, Floral Avenue Greenhouses, Mt. Clemens, Mich.

Dozens of Armstrong "blast" traps are used at this greenhouse to drain heating coils operating at 2 to 10 lbs. pressure with a 10" vacuum return.

Armstrong traps are especially desirable for low pressure vacuum return systems because of their durability and long service without leakage. (It's the leaky traps that make you lose vacuum.)

There is nothing in an Armstrong trap to rupture. The bucket is open. Every trap is factory tested at 500 lbs. water pressure. Hardened chrome steel valve and seat ... stainless steel bucket and lever assembly—the same design, materials and workmanship used in Armstrong traps for power plant service at 900 lbs. pressure, 900 degrees temperature! It's no wonder they last for years without repairs in low pressure vacuum return service. Don't ever let anyone tell you the Armstrong inverted bucket trap isn't good for this service. It's best! There's proof galore. Ask your Armstrong Representative for the facts, or write:

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FREE FACTS FOR YOU . . . Ask for these reprints: "Vacuum isn't Vacuum to a Steam Trap" and "Flash at Traps". Here are facts to give you better trapping. Write or call today, no obligation.

836

Atomic Power

(*Continued from page 72*)

by Dr. Lawrence R. Hafsted, atomic energy consultant to the Chase National Bank, that there is no immediate demand in view for substantial bank loans. Private financing appears to be adequate at present for manufacturers of component parts.

After 1960, when significant numbers of atomic power plants are expected to appear, the demand for heavy financing will undoubtedly increase. Dr. Hafstad emphasized that atomic products such as radioisotopes will have a greater immediate impact than atomic power generation and this class of atomic activity will make the earliest demands for bank financing.

The Russian Plant

The Russians announced that they will release a technical report on their 5,000 kw atomic power plant to the international conference on atomic energy to be held in Geneva, Switzerland, late this summer under the auspices of the UN. Although it has been rumored for some time that the Russians have an atomic power plant, no foreigner has seen it; its location is a secret and its date of completion is unknown.

One can hope that the Russians will present useful information in the interests of peaceful developments of atomic energy. Yet it is important to bear in mind that there is no problem in building an atomic power plant which will work. The problem is to build a plant that will produce electric energy economically. Whether or not the Russians have achieved economic atomic power, in United States terms, is a big question mark.

British Plans

The British Government has announced a program to build twelve atomic power plants during the next ten years with a total installed capacity approaching 2,000,000 kw. The program will cost in the region of $840,000,000 and the new plants represent 10% of the present electric generating capacity in the British Isles. By 1975 it is expected that atomic power plants will total 14,500,000 kw of installed capacity or 72.5% of the present capacity of all power plants.

Britain had an early start in the development of atomic power with the construction of a full-scale atomic power plant at Calder Hall in the north of England. The cost data obtained from this plant supported the decision to proceed with the major construction program with minimum delay. All the proposed plants will use breeder reactors producing salable plutonium and the expected total cost of producing electricity from these plants is 5 mills per kilowatt-hour. This figure is comparable to the future cost of electricity produced in conventional steam power plants.

In Britain the power industry is nationalized but it is significant to note that all the new atomic power plants will be built by private companies for operation by the government.

Calder Hall

The atomic power plant at Calder Hall has a gas-cooled reactor, a type not meeting with general favor in this country. However, the new construction program will include reactors utilizing liquid metals as coolants and homogeneous reactors similar in principle to the one at North Carolina State College. For a 200,000 kw atomic power plant the total cost of the original charge of uranium will be in the neighborhood of $14,000,000 and should be good for three to five years.

The value of the plutonium produced in this period is restricted information but it is known that it will represent a substantial deduction from the fuel cost even after all processing charges are taken into account. As much heat can be extracted from one ton of uranium as from 10,000 tons of coal.

Schedule

The schedule for beginning construction of the twelve new atomic power plants is as follows:

Two gas-cooled stations (two reactors each)	Mid-1957,
Two improved-type gas-cooled stations (two reactors each)	1958-59,
Four stations, gas-cooled and homogeneous (one reactor each)	1960,
Four stations, liquid-cooled (one reactor each)	1961-62.

Private Enterprise

When the Atomic Energy Act of 1954 was passed, liberalizing many of the provisions under which private enterprise can participate in the development and use of atomic energy, a number of skeptics raised the cry that private industry would not participate without substantial government support. The recent announcement that Consolidated Edison Company of New York intends to go it alone on a 200,000 kw atomic power plant should silence the skeptics for all time.

The 200,000 kw atomic power plant is the largest one undertaken thus far. Furthermore it is to be financed entirely by Consolidated Edison without any government assistance whatsoever. Vitro Corporation of America has been retained as consultant for the project and Consolidated Edison will train its own operators. Atomic fuel will be leased from the government, as required by law, and the standard rate is to be paid without any concessions. Hence, this will be the first atomic power plant built anywhere in the world as a pure private venture in the true American tradition.

In view of the uncertainties about the costs involved in atomic power plants many engineers have been curious about the reasons for Consolidated Edison's bold venture into this new field. The reasons were given in a statement by James M. Fairman, Vice President of Consolidated Edison, who has said, "It may not be possible to build a commercial atomic power plant yet, but we think it may well be. And we never will know until we try to build one."

Of course, one can be certain that Consolidated Edison is not gambling with $60,000,000 to $71,-

(*Continued on page 76*)

B&W FM Boilers help keep bulk liquids "on tap" at General American Tank Storage Terminal

General American Transportation Corporation serves South Central shippers and processors of bulk liquids through its Goodhope, Louisiana, Tank Storage Terminal (one of 6 throughout the country). This valuable national service assures industrial consumers of quick delivery of whatever they want when and where it is needed: Chemicals, Petrochemicals, Petroleum products, Molasses, Vegetable oils. Any liquid that can be transported is always on quick-call—a 48,000 GATX tank-car fleet provides dependable service.

Helping to insure fast delivery from the Goodhope Terminal are two B&W Type FM Boilers. They furnish steam to drive oil-pumping equipment for loading or discharging crude oil for delivery or storage. These gas-fired units supply a total of 48,000 lb of steam per hr. at 235 psi. Other FM Boilers are "working on the railroad", providing steam for heat in railroad stations and shops and heat for rolling stock in coach and marshalling yards.

This is another example of the FM's versatility—a versatility that encompasses power, processing, and heating, for institutions, utilities, industries and agriculture, both indoors and out.

The FM Boiler is available in individual units in capacities to 40,000 lb of steam per hr, with fully automatic control. Listed at right are FM maintenance and cost-saving features that many users are right now enjoying. If you are interested in "package" heating, processing, and power, and their many benefits, send for Bulletin G-76A. Further, we will be glad to discuss with you any details that may be special in your operations. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

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G-695

BABCOCK & WILCOX

BOILER DIVISION

Atomic Power

(*Continued from page 74*)

000,000, the expected cost of the plant, without a good idea of where it is headed. The company has been studying the feasibility of atomic power since the fall of 1952 as a member of an industrial study group known as Atomic Power Development Associates. The company spent $200,000 on these studies last year and expects to spend $400,000 this year.

The type of atomic power plant that Consolidated Edison had in mind had not been made known at the time this was written. Unofficially, there is some favor for a fast breeder reactor using a liquid metal as a coolant. The plutonium produced as a by-product would be sold to the government at its market value, a factor which could contribute substantially to the reduction of fuel costs. Also under consideration is a supplementary superheater, fired with conventional fuels, to permit the use of standard steam turbines.

Going into High

Four new atomic power plants will be built in Illinois, Massachusetts, Michigan and Nebraska at a total cost of $150,000,000 of which 80% to 90% will be furnished by the utilities concerned. The balance of the cost will be borne by the Atomic Energy Commission as part of its contribution to the development of economical atomic power. The Atomic Energy Commission will also waive for a seven-year period all costs for loans of source and special nuclear materials and will perform some research and development work in Atomic Energy Commission laboratories without cost.

In the Chicago area a 180,000 kw atomic power plant will be built by a combine called the Nuclear Power Group composed of American Gas and Electric Service Corporation, Bechtel Corporation, Commonwealth Edison Company, Pacific Gas and Electric Company, and Union Electric Company. This plant is expected to go into operation in 1960 and will cost about $60,000,000.

A 100,000 kw atomic power plant will be built in the Detroit area by a group of utilities including Central Hudson Gas and Electric Corporation, Cincinnati Gas and Electric Corporation, Consumers Power Company, Delaware Power and Light Company, Detroit Edison, Long Island Lighting Company, Philadelphia Electric Company, Rochester Gas and Electric Corporation, and Toledo Edison Company. This plant will be completed in 1958 at an estimated cost of $35,000,000.

Another atomic power plant having a capacity of 100,000 kw will be built in Western Massachusetts by the Yankee Atomic Electric Company, composed of a group of twelve New England utilities. This plant will cost an estimated $30,000,000 and will operate for the first time in late 1957. An unusual feature of this plant is that it will be owned by the member utilities in the Yankee Atomic Electric Company and power will be sold to the members on the basis of their size and demands.

A plant with capacity of 75,000 kw will be built near Columbus, Nebraska, with completion expected in 1959. The plant is being built by Consumers Public Power District of Columbus at an estimated cost of $25,000,000.

The first full-scale atomic power plant, having an ultimate capacity of 100,000 kw, is well under way and will be completed in late 1956. This plant is being built for Duquesne Electric Light Company at a total cost of $54,000,000 excluding a sum of $45,000,000 spent for research and development.

An interesting development in atomic power plants is the almost unbelievable decrease in generating costs since the Duquesne plant was first proposed. In the Duquesne plant, the first atomic power plant, the total cost of generating electricity has been estimated to be between 11 and 20 mills a kilowatt-hour. For the Consolidated Edison atomic power in New York the cost has been chopped to 9 mills per kilowatt-hour and officials expect that advances achieved before the station goes into operation will reduce the cost further to 7.5 mills per kilowatt-hour. At this figure atomic power will be competitive with power from conventional stations.

Still another atomic power plant is in the last stages of planning. This will be a 100,000 kw breeder atomic power plant for Philadelphia Electric Company and is expected to cost between $45,000,000 and $56,000,000. The higher construction cost of this plant is expected to be offset by the sale of fissionable nuclear materials produced in the breeder reactor.

In the South

Atomic power plant is not confined solely to large utilities. Here in the South, the Seminole Electric Cooperative, Inc., at Madison, Florida, is planning a 10,000-kw atomic power plant to lick the high cost of electricity in what is one of the highest fuel-cost areas in the country. Among other atomic power plants in the planning stage is 60,000 kw for Arizona, which is expected to generate electricity at 7 to 7.5 mills per kilowatt-hour.

Excluding the atomic power plants which are still in the planning stage, the committed atomic power construction at this date represents almost one per cent of the total power generating capacity in the nation.

Downward Cost

The cost of producing electricity in atomic power plants is rapidly approaching that of conventional plants. One can now safely say that atomic power plants are destined to compete favorably with conventional power plants in nearly all sectors of the country except where fuel costs are unusually low.

Competition

In fact, if the present downward trend of costs continues, the atomic power plant will out-compete nearly all of our present steam power plants in the next two or three years. With this incentive, rapidly advancing technology and know-how, and firm cost data obtained from the present plants a large number of utilities will jump into the atomic power field. The atomic-power age is about to begin.

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$5,000 GREASE JOB IN TEXAS PLANT

A $5,000 grease job was recently completed at the Freeport, Texas, plant of The Dow Chemical Company. Some 26,900 ball and roller bearings were relubricated, one after the other, with a silicone grease selling at over $6 a pound. To assure adequate lubrication without a speck of waste, a "metered" gun was used. Exactly half an ounce was measured out per bearing. Even so, the job required over 840 pounds of grease.

On the other hand, it was the first time any one of these bearings has ever been relubricated, despite constant exposure to extreme temperatures and corrosive atmospheres, since their installation almost five years ago. Although it's impossible to calculate the savings this has meant by eliminating lost production, downtime, maintenance costs and replacement expenses, Dow officials agree that the original grease has more than paid for itself.

High Temperature

The bearings support long lines of rollers on which newly filled drums of solid caustic soda are racked for a prestorage or preshipping cooling off period. Drums are filled with molten caustic at a temperature of about 698 F and conveyed to the racks immediately. For 16 hours they stand, radiating heat, until they have cooled sufficiently for handling.

The heat given off by the loaded drums would tend to break down any conventional bearing lubricant in short order. Before long a bearing would freeze, a roller would jam, and a smooth working operation would begin to falter into unpredictable stops.

Five Years Service

When the cooling rack and conveyors were built in 1949, every single bearing was filled with Dow Corning 41 Grease. That was the last attention they received, except for occasional inspections, until, almost five years later, a few of the rollers showed signs of sticking or "hanging." In line with the best maintenance practice, Dow didn't hesitate. Each bearing has since been relubricated—and the entire setup is ready for a second five years of trouble-free service.

Long lines of rollers are supported by 26,900 ball bearings. Drums of caustic at 698 F are placed on the rollers, where they cool for 16 hours.

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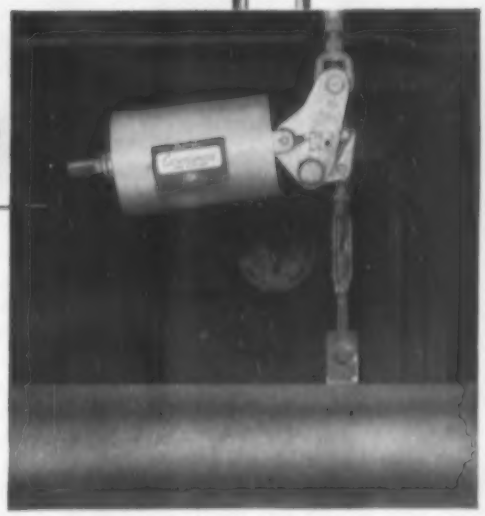
The constant load-carrying capacity of Navco Counterpoise* Pipe Hangers has been proven during an extended period of satisfactory service as the first accurate and efficient support for high temperature piping systems. They are being used extensively in steam generating stations, refineries and chemical plants.

The Counterpoise Hanger is a spring-actuated counterbalance. An ingenious system of linkage transforms the varying force of the spring in an accurate mathematical ratio to produce a load supporting effort of constant value throughout the entire range of expansion travel.

The design permits great flexibility of installation and saves valuable space in congested areas. All parts are ruggedly made and have a high safety factor, yet excess weight and oversize physical dimensions have been avoided to hold space and structural load requirements to a minimum.

The Navco Counterpoise Hanger is available in 16 different frame sizes with load capacities ranging from 200 to 16,000 pounds and expansion travels up to 12 inches. For detailed information on how you can get dependable support with this unique hanger, write today for our 12-page illustrated bulletin #153.



Note above how the flexible top connection permits the hanger assembly to fall in line with the direction of the load pull, so that horizontal travel of the piping has no appreciable effect on the hanger operation. The unit may be positioned at any angle. This affords flexibility in installations where close clearances are a factor.

* *Counterpoise is a trade name of the National Valve & Manufacturing Company*

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No One Got Hurt . . . But Was It Safe?

A LARGE concrete dam was in the process of construction and Pete Rhodes, the electrician for the general construction company, rushed into the power plant and said to the operator-in-charge: "Listen Ed, I've just noticed that one of the sheaves on the wire rope tramway system is just about ready to drop off; I've seen the superintendent and he says he'll give me ten minutes to fix it; that is he'll stand for a ten minutes shutdown.

"The trouble is at the seven mile frame and I'm going to drive there right now. Listen, you pull the circuit breaker on the No. 4 line and kill the 4160 volt three phase power fifteen minutes from now and then close the breaker after ten minutes. The power lines run right over the sheave support and I don't want to take any chance. Savvy?"

"You'd be crazy to try to climb the frame with the high voltage on," said Ed, "but you know I haven't authority to pull the No. 4 breaker on your say-so. My orders are to keep the power flowing on the contractor's lines so he can't demand a time extension—an' he's behind schedule right now. You'll have to take this matter up with Steelworth, the head engineer."

Pete got Bill Steelworth on the phone and explained why an immediate repair was necessary—if the sheave fell off the tramway frame the wire cable would probably tangle and wreck the tramway system. Pete also explained that he did not relish attempting to crawl around the framework with the 4160 volt three phase wires around him.

"Don't try it, Pete," advised Steelworth. "How long will it take you to get there, fix the sheave and get back?"

"It's seven miles out, the trail is rough an' it'll take me say, fifteen minutes to get there; climbing the frame and tightening the bolts will take ten minutes and then there will be fifteen minutes coming back—say forty-five minutes for the entire trip. If you will pull the breaker fifteen minutes from now an' leave the circuit open for fifteen minutes I guess I'll get the job done—OK?"

"That scheme I will not agree to—it's too dangerous," snapped Steelworth. "Here is what I will agree to: I'll pull the breaker at 1:45 but I positively will not close it again until I am sure you are safely back on the ground; therefore, I will wait until you drive back right here where I can see you—is that OK?"

"Right you are Mr. Steelworth an' I sure appreciate what you suggest.

At 2:10 no word had come from Pete and the superintendent was back again on the phone: "Put that power on," he demanded. "We've got a hundred men idle. Pete's through by now and on his way back. He's probably got a flat an' changing a tire. Close that breaker."

"No power on No. 4 until I see Pete or am convinced he's safe—that's our arrangement and it sticks," Steelworth said sharply.

The superintendent slammed his phone down. Five minutes passed and then the project engineer called Steelworth: "Listen Bill, the general contractor has just called. He states that you have refused his superintendent's request to return power to No. 4 line; he also says his electrician is held up by a flat tire as he was on his way back to tell you the tramway is OK. The G.C. is emphatic and says if he doesn't get power immediately he'll have to put in a claim for delay damages. This could be serious."

"The superintendent," said Steelworth, "does not know where Pete is; he just thinks Pete is through, but I personally promised Pete that the power would not be switched on until Pete, himself, shows up and tells me: 'All clear.' That must stand."

"OK!" answered the project engineer. "Stick to your arrangement—I'll back you—but don't get us involved in a big damage suit."

The phone rang again; it was the general contractor himself: "Steelworth; what's all this I hear? My superintendent says you are refusing to return power to No. 4 line and all his men are sitting around: This obstinate attitude of yours is going to be mighty expensive—this is a very serious matter."

"Serious or not," answered Steelworth, "the power is off until your electrician personally tells me he is in the clear. I'm sorry—but NO POWER until I know Pete is away from the 4160 volt line."

Steelworth had sent Joe in the pick-up to find out what had happened to Pete and another half hour passed before Joe and Pete came rattling up to the engineer's office. Steelworth promptly called through his office window: "Hello Pete! Is everything clear?"

"OK. Close the No. 4 breaker," Pete yelled back and Steelworth phoned the OK to the power house to close No. 4 breaker.

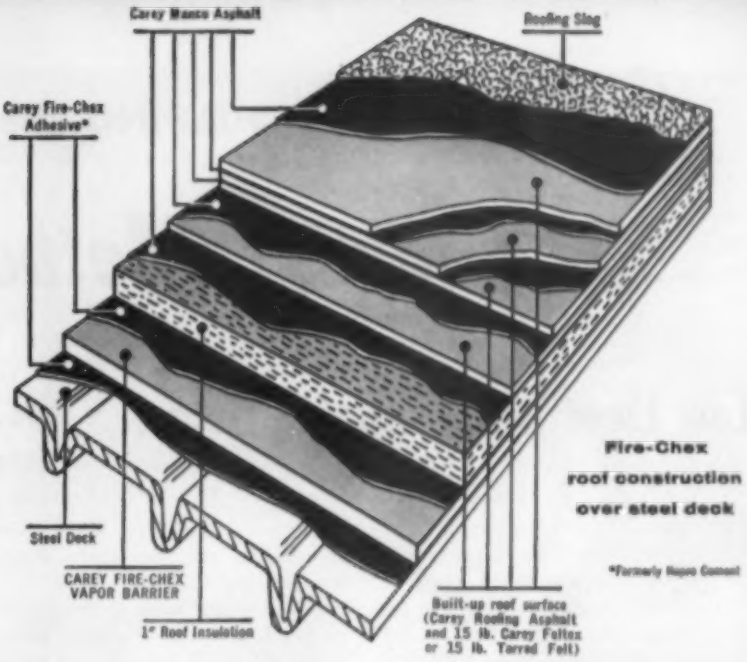
What had happened was that when Pete was replacing the worn bolts in the sheave support he noticed that one of the insulators on the 4160 volt line, on top of the frame, was badly cracked and while he was tapping it to check the extent of the crack, it fell into two pieces. Pete then had to drive another three miles to the crusher plant, where he knew there was a couple of extra 5000 volt insulators, and then return and install the new part. Pete actually was working on the 4160 volt line when the superintendent was telling Steelworth that he (Pete) was through with the repair job and held up by a flat tire.

Steelworth's determination to stick to his agreement undoubtedly saved Pete's life.

Any Comments?

EDITOR'S NOTE: While the above reads like fairly good performance—the procedure followed includes at least one inexcusable "safety boner." Perhaps one of our readers will want to send in a brief article about the "boner," and tell how the job should have been handled.

Removes all doubt about the fire-safety of built-up roofing!


Carey Basco Asphalt
Roofing Slag
Carey Fire-Chex Adhesive*
Steel Deck
CAREY FIRE-CHEX VAPOR BARRIER
1" Roof Insulation
Built-up roof surface (Carey Roofing Asphalt and 15 lb. Carey Feltex or 15 lb. Tarred Felt)

Fire-Chex roof construction over steel deck

*Formerly Repco Cement

Carey Fire-Chex Asbestos-Plastic Vapor Barrier

Application is Easy—
Simply apply Carey Fire-Chex Adhesive* with brush or spray over entire deck. When adhesive becomes tacky . . .

Apply a full 36" wide sheet of Fire-Chex Vapor Barrier, sanded side to deck. Allow 3" side lap, 6" end lap.

Seal both ends securely with Fire-Chex Adhesive. Continue application, lapping each sheet 3". Now apply insulation and built-up roofing.

In Carey FIRE-CHEX, you have a vapor barrier that *does not contribute to fire and cause it to spread!* Even when installed over a standard steel deck that becomes red-hot in a fire, FIRE-CHEX remains intact—*does not release melting asphalt and excessive gases!* Product of over a million dollars invested in development, tests *prove* FIRE-CHEX removes all doubt about fire-safety in built-up roofing.

Why take chances with ordinary, hazardous vapor barriers that have been responsible for multi-million-dollar industrial plant fires? FIRE-CHEX assures you priceless protection for your buildings—*and is available for just a few cents more per square* than the conventional type.

Write today for a sample of this Carey dependable product, and for your copy of the FIRE-CHEX Specification Sheet. Or, request a Carey Industrial Sales Engineer to call. Address Department SPI-6.

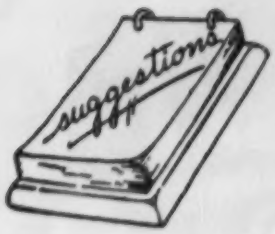
Serving Industry, Farm and Home Since 1873

Carey

Asbestos-Plastic
Fire-Chex Vapor Barrier
...does not contribute to fire!

THE PHILIP CAREY MANUFACTURING CO. Lockland, Cincinnati 15, Ohio In Canada: The Philip Carey Co., Ltd., Montreal 3, P. Q.

Built-up Roofs • Asbestos and Asphalt Saturated Felts • Roof Coatings and Cements • Fiber-Flex Glass Roof System
Careystone Corrugated Asbestos-cement Roofing & Siding • Thermal Insulations



HELPING the *MAN-IN-THE-PLANT*

Ideas . . Methods . . Gadgets

Low Elevation Deaerating Heater

Sub-cooling Saves for Texas Plant . .

RECENTLY, a chemical manufacturer in Texas expanded facilities at a new location, requiring installation of 600 psig 750 F boilers operating on 90%-100% makeup with extraction turbines for power and process steam production.

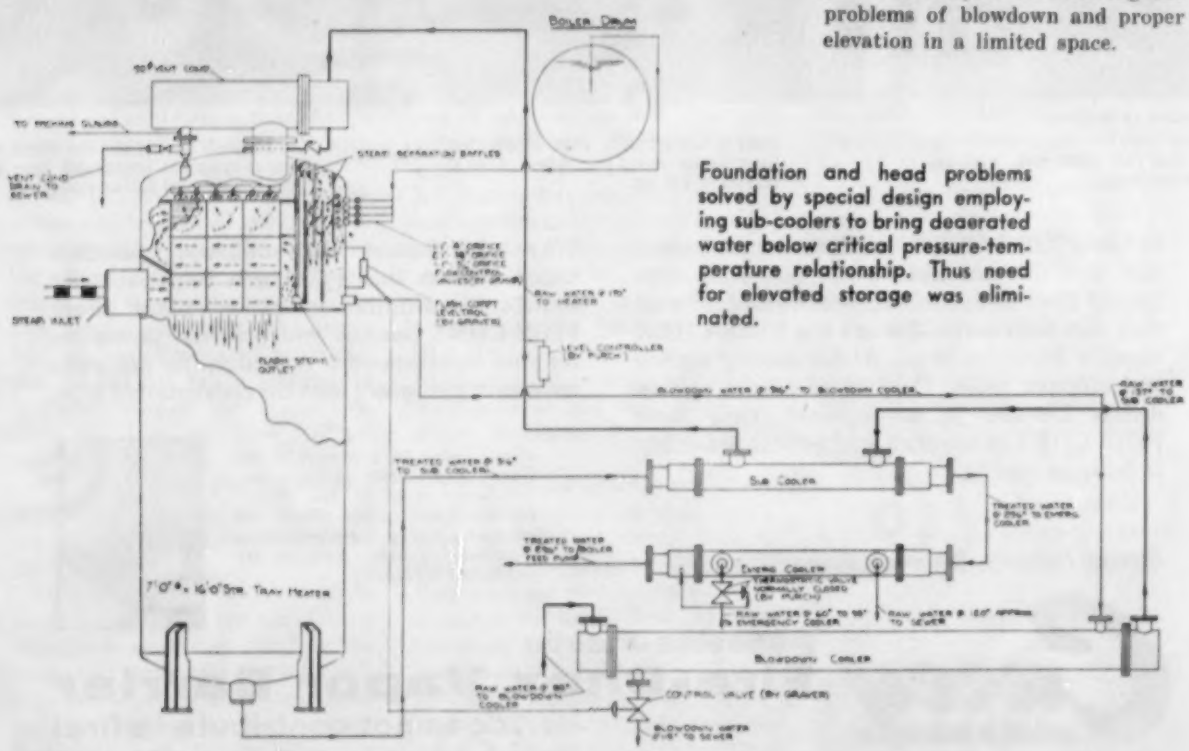
The water that was to be used was quite high in non-hardness or non-carbonate salts and silica at times and provision had to be made for up to 35% blowdown. Space was a limiting factor as far as obtaining enough elevation to obtain a proper NPSH on boiler feed pumps. In addition, there was a low bearing soil that would have required piling work if the 50,000-60,000 lb heater plus piping had to be raised 50 ft into the air to obtain the required head.

With these factors in mind, plus many other technical considerations based on the chemical and mechanical aspects of the problem, Graver Water Conditioning Company designed a Sub-Cooling, Combination Flash Blowdown Deaerating Heater as shown in the sketch.

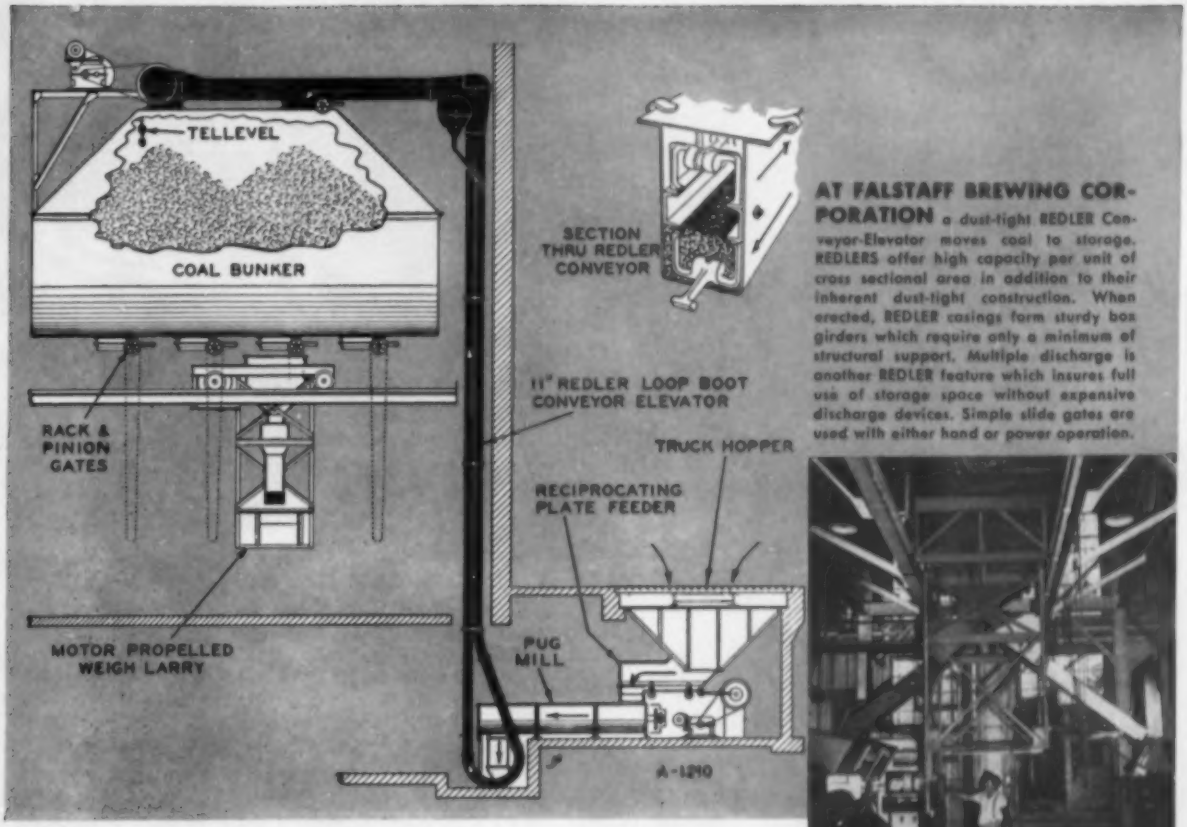
This unit is so designed that blowdown from the boilers goes into a special section in the heater and flashed steam from the blowdown is employed in the deaeration process. Blowoff liquid drains are cooled in an attached heat exchanger.

Instead of elevating the heater, the deaerated water is sub-cooled or chilled before going to the pump to a temperature that will be below the critical pressure-temperature relationship and this prevents flashing in the pump.

All heat exchangers were mounted directly on the heater itself to give one compact unit solving the problems of blowdown and proper elevation in a limited space.



Foundation and head problems solved by special design employing sub-coolers to bring deaerated water below critical pressure-temperature relationship. Thus need for elevated storage was eliminated.



AT FALSTAFF BREWING CORPORATION a dust-tight REDLER Conveyor-Elevator moves coal to storage. REDLERS offer high capacity per unit of cross sectional area in addition to their inherent dust-tight construction. When erected, REDLER casings form sturdy box girders which require only a minimum of structural support. Multiple discharge is another REDLER feature which insures full use of storage space without expensive discharge devices. Simple slide gates are used with either hand or power operation.

Good Housekeeping Starts with Dust-Free Coal Delivery

From boiler-room to bottling-line, cleanliness is the keynote of Falstaff's brewing process!

A key to the spotless maintenance in this St. Louis plant is a compact REDLER Coal Conveying System. Designed for automatic operation, this completely *sealed* system moves coal from track hopper to stoker hoppers and never gives dust or dirt a chance to escape along the way. In addition to its dirt-free operation, the REDLER System provides important savings in man power. These features, plus meeting of limited space requirements, made a compact REDLER the logical choice on all counts.

If clean handling — of coal or any commodity — in limited space, at low cost per ton is important to you, a REDLER Conveying System will meet your complete requirements. Our engineering department will welcome the opportunity to survey your problem. Use the coupon today.

STEPHENS-ADAMSON MFG. CO.

30 Ridgeway Avenue, Aurora, Illinois
Los Angeles, Calif., Belleville, Ontario

Engineering Division	Specialists in the design and manufacture of all types of bulk materials conveying systems.
Standard Products Division	A complete line of conveyor accessories including centrifugal loaders—car pullers—bin level controls—etc.
SealMaster Division	A complete line of industrial ball bearing units available in both standard and special housings.

Stephens-Adamson Mfg. Co.
30 Ridgeway Avenue, Aurora, Illinois

Please send me your Bulletin No. 140 on REDLER Conveyors.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

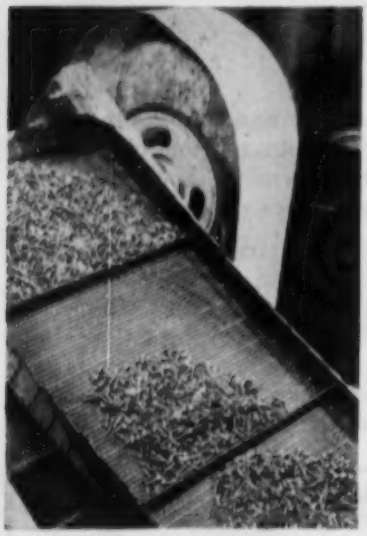
Ideas . . Methods (continued)

Woven Wire Belt Maintenance Tips

ONCE a woven wire conveyor belt has been properly installed and has begun production operation, there are many maintenance tips to be aware of to help provide longest belt life.

First, of course, is **periodic inspection** to make sure that the belt is traveling straight, that good consistent traction is maintained between the belt and the drive pulley, that all idler rollers are turning freely and that there is no undue friction between the edge of the belt and the guiding devices.

A clean belt will also contribute to maximum life. Continuous cleaning may be accomplished by including a driven roller brush in the conveyor in the cases of belts used for processing powder materials. Live steam may be used to clean the belt where the belt comes into contact with oils



or greases. Chemical cleaners may be used for removing scale or similar foreign matter from the belt.

Here are some additional tips. **Maintaining a stack return** on the belt makes the travel of the belt easier to control. **Loading a belt evenly** across its entire width eliminates the possibility of uneven strains which might result in general distortion. **Reversing the belt,** that is turning it over, when the pulley contacting surface becomes worn will prolong the life of the belt. Keeping the belt in constant motion while operating under temperature eliminates the chance of burning any given area of the belt as well as preventing a contraction in width which is sometimes caused by a sudden start under temperature when the belt is frozen to the hearth.

Of course, you should keep an eye out for damage to the **belt surface** during your periodic inspections. Make sure that broken spirals or connectors are repaired as well as torn areas at the edge of the belt.

As in the case of any mechanical equipment, proper care means longer wear and proper care in the case of woven wire conveyor belts means nothing more than the use of good common sense in making your periodic inspection trips.

Data courtesy The Cambridge Wire Cloth Company, Cambridge, Maryland.

Portable Tube Storage Rack

THIS photograph is of a Portable Tube Bundle Storage Rack of our design for use in our fabricating shop. It has served us well by improving our efficiency and housekeeping.

The frame is constructed of 3" x 3" x ¼" angle iron using 1½" x ¼" flat bars for reinforcing. Shelves are constructed from ¾" round bar with a vertical center bar serving as reinforcing of the seven shelves. The over-all height of the frame is 6 ft, the length is 12 ft, the bottom of the frame is 5 ft wide and the top is 2 ft 6 in. The five lower shelves are spaced on 9 in. centers and the top two are on 7 in. centers. Wheels are 8 in. in diameter ball bearing with solid rubber tires.

The use of this rack eliminates tube damage during fabrication and assembly and enables craftsmen to assemble all their material in a convenient location for easy movement to job site.

By W. E. ACKERMAN, general contract supervisor, maintenance department, Carbide and Carbon Chemicals Company, Texas City, Texas.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

A pencil pokes through this corroded metal! Why chance trouble like this? Cathodic Protection and Anaconda Type CP Cable effectively check corrosion of buried metals.

CHECK CORROSION by cathodic protection with Anaconda Type CP Cable

Corrosion of buried metals costs industry over a *billion dollars a year!*

But most of this can now be prevented—by Cathodic Protection.

Corrosion—caused by minute electric currents flowing from metal into adjacent soil—is checked by applying direct current from an external source. This eliminates anodic areas, makes the entire metal surface cathodic and stops the flow of current from the metal.

But moisture, oil, acids and alkalies often found in corrosive soil areas are tough on cable.

Because of our many years of experience with buried cable, Anaconda has been able to produce a new Type CP cable – specially designed with double jacket of polyethylene and Densheath® (PVC) – to resist these enemies of cable life. This means less replacement . . . major savings in both labor and material costs.

Would you like more information on how Cathodic Protection checks corrosion?... and detailed information on Anaconda Type CP Cable? Ask the Man from Anaconda – or send for bulletin DM 5450, "Anaconda Cathodic Protection Cable." Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

53160

® Reg. U. S. Pat. Off.

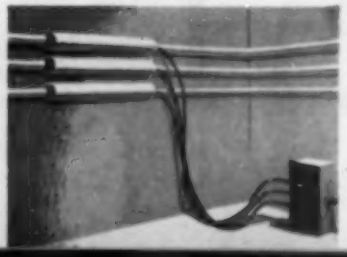
ANACONDA®

COPPER AND ALUMINUM WIRE AND CABLE

Where Anaconda Type CP Cable and Cathodic Protection Cut Corrosion Costs.

Gas mains and water pipes

Lead-covered cable



Underground storage tanks

Transmission towers

How to have clear telephone service... even in the middle of the proverbial "BOILER FACTORY"!

GAI-PHONE
(pronounced GAY-phone)
... the wonderful new electronic telephone for noisy areas

EVER TRY to talk to your chief engineer while he checked meters at a generator? Or to your production manager while your biggest and noisiest machinery ran full-blast? Such a situation *could* be no problem at all, if your man were talking to you on a GAI-PHONE.

This ingenious electronic telephone—using some vacuum tubes, rectifiers and other devices in its special base—actually creates a *Zone of Quiet* around the user's head. His voice comes through clear as a bell, but the extraneous noise is effectively suppressed. What's more, he can adjust *his* telephone so that your conversation is clearer and the annoyance of side-tone is reduced.

Best of all—it's all much less expensive than building soundproof booths or such. Let us tell you more—send coupon today.

STROMBERG-CARLSON®
TELEPHONE DIVISION • ROCHESTER 3, N.Y.

Please let us have more information on your GAI-PHONES, for use in noisy areas.

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News (continued)

(*Starts page* 10)

Winder Aircraft—Georgia

WINDER AIRCRAFT CORPORATION of WINDER, GEORGIA, has acquired a large tract of land at Tifton, Georgia, where it will build a modern manufacturing plant.

The firm will move its entire facility, in the very near future, into the new plant, and in the meantime, has leased a temporary building in Tifton, where limited scale operations will proceed until the new plant is completed.

The Winder Aircraft Corporation has current electronic manufacturing contracts with the Armed Forces, and will broaden and enlarge its activities in Tifton, where it will manufacture navigational equipment of a complex nature, for both military and commercial usage.

A. W. MCCAGHREN, who has been factory manager at Winder, will be transferred as factory manager of the new plant at Tifton.

Duke Power to Build Charlotte Warehouse

DUKE POWER CO. has announced that it will construct a $750,000 warehouse on a 62-acre site near CHARLOTTE, N. C., as a central storage point for the company's service area in the Piedmont Carolinas.

The L-shaped, single-level, brick structure will contain 58,500 sq ft of heated storage space, 54,000 sq ft unheated, and 19,100 sq ft of open assembly area covered.

Architect for the project is Francisco & Jacobus of New York City.

A railroad siding with canopy will serve one side of the building and a large covered platform for assembly loading of trucks will be located in the angle of the "L." Each loading platform will contain one self-leveling platform to accommodate trucks of different tailgate heights.

The building will contain fluorescent lighting, sprinkler system, air conditioned office, humidity controlled space for special equipment and tools, two assembly areas for disbursing materials, and motorized overhead doors.

Outside yard lighting will be provided for accessibility to materials at night. Of this yard area, 230,000 sq ft will be paved to provide storage for large power transformers, oil circuit breakers, and other outdoor items.

Among thousands of items to be

stored are distribution transformers, pole line, and high-voltage transmission line hardware, relays, meters, communication equipment, and wire and cable.

The consolidated warehouse project is part of the company's expansion program in which it expects to increase its system capacity 50% in the period 1954-60, requiring an estimated $35 million expenditure annually.

Herty Medal for Dr. Soday

DR. FRANK J. SODAY, president of the Southern Association of Science and Industry, was selected as the 1955 Herty Medal Winner for his outstanding contribution to the field of chemistry in the South.

Doctor Soday is vice president and director of research and development for THE CHEMSTRAND CORPORATION, DECATUR, ALABAMA. He holds over 130 U. S. patents, principally in the field of petrochemicals, and has been actively engaged in scientific and industrial developments in the South for many years.

The purpose of the award is to give public recognition to the work and service of outstanding chemists who have contributed to their chosen field. An additional purpose is to honor Dr. Charles H. Herty, who pioneered the development of the paper industry in the Georgia area. The medal is given by the Chemistry Club of Georgia State College for Women and awarded by the Georgia ACS section.

New Mallory Plant—Ala.

A $1,500,000 electrolytic capacitor manufacturing plant in HUNTSVILLE, ALA., for P. R. MALLORY, INC., was recently completed by DANIEL CONSTRUCTION COMPANY of Birmingham, the general contractor.

The new one-story 70,000 sq ft structure in which capacitors will be assembled, augments manufacturing operations of the P. R. Mallory plant in Indianapolis.

Totally enclosed and air conditioned in assembly area and offices, the plant has cement block walls and a partial brick face, with cement block and acoustic tile interiors. Bar joints support the fabricated and insulated steel roof deck. Except for etching, bath and boiler rooms, lighting is fluorescent.

Conveyors and tow motors move materials in the plant which houses a specially built capacitor motor handling system.

LIFT

the efficiency of your hydraulic unit with Roper dependable Pumps. Get optimum performance from the pumps that feature just two moving parts — equal size gears operating in a sturdy case with proper clearance for superior service and long life. The models shown are representative of standard Roper pumps suitable for most applications.

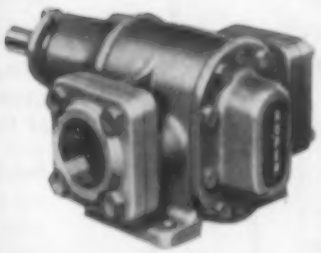
Specify **ROPER** *Rotary Pumps* FOR YOUR **HYDRAULIC APPLICATIONS**

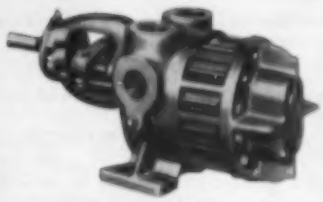
LOWER

maintenance costs with a Roper. For instance, a pump like the Series H with pressures to 1000 P.S.I., sizes 10 to 75 G.P.M. is ideally suited for hydraulic mechanisms and for other applications requiring high pressures. Spur gears run in axial hydraulic balance . . . bearings and bronze wear plates reduce friction under heavy loads. Available with packed box or mechanical seal.

PUSH

the unit in your hydraulic circuit with the correct size Roper for the particular job. In many cases the Series K will do, for it is rated from pressures to 150 P.S.I., capacities ¾ to 50 G.P.M. This model is compact, sturdy . . . is self-lubricated by liquid pumped . . . handles total suction lifts up to 25 feet. Comes with packed box or mechanical seal . . . with or without relief valve.





ROPER Rotary Pumps

GEO. D. ROPER CORPORATION

436 Blackhawk Park Ave., Rockford, Illinois

PULL

favorable comment on a wise choice when you install a Roper as original equipment. Among the dependable Ropers is the Series F Pump — pressures to 300 P.S.I., sizes 1 to 300 G.P.M. It features four-part design with 8 optional piping arrangements . . . supplied in standard or stainless steel fitted models. With packed box or mechanical seal; with or without relief valve.

"Electricity and Electrical Power"

Basic information on the fundamentals of electricity for the first time available in ONE Volume!

A limited edition of this important handbook has just been printed and is available to subscribers to SOUTHERN POWER AND INDUSTRY only. Order your copy NOW with a new or renewal subscription to this magazine.

A series of seven articles, "Electricity and Electrical Power" by Roy W. Wages, industrial engineer for Georgia Power Company, was published last year in SOUTHERN POWER AND INDUSTRY and received wide attention and favorable comment from plant engineers in the South and Southwest.

Demands for reprints of this series became so great that we have had all the articles bound in one volume. This useful 72-page book is now available to SOUTHERN POWER AND INDUSTRY subscribers exclusively.

In simple, practical terms, Mr. Wages makes clear the mysteries of electricity all the way from explaining and defining a volt to a discussion of the sine curve of alternating current motors. The book is liberally illustrated with diagrams and pictures which help make the text crystal clear. Throughout the pages, the author does everything possible to simplify the presentation of facts for easy study and understanding.

Here is a book you will want to keep for reference and for training periods. Pocket sized, it is convenient to carry anywhere . . . for checking right on the job.

All you have to do to own this valuable booklet is to check the coupon below now, and send it back to us. For three dollars, you get a three-year subscription to SOUTHERN POWER AND INDUSTRY *plus* "Electricity and Electrical Power"!

The editors will welcome you into the growing family of SOUTHERN POWER AND INDUSTRY readers.

Yes! I accept your invitation. You may enter my 3-year subscription to SOUTHERN POWER AND INDUSTRY and send me my personal copy of Electricity and Electrical Power at the special combination rate of $3.00.

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CLASSIFICATION DATA

If an individual give name of firm connected with and title of position.

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Products manufactured or nature of business .....

Enclose coupon with remittance. If you want to be billed, send coupon alone.

SOUTHERN POWER & INDUSTRY

806 Peachtree Street N. E. Atlanta 5, Georgia

News (continued)

Robt. S. Stevenson Elected President of Allis-Chalmers

ROBERT S. STEVENSON has been elected president of ALLIS-CHALMERS MANUFACTURING COMPANY, Milwaukee, Wis., to succeed the late William A. Roberts who died in April. Stevenson has been executive vice president of the company since July, 1952.

He started with Allis-Chalmers in 1933 as a salesman in the Tractor Division at the Kansas City, Mo., branch. In 1936 he was transferred to the company's home office in Milwaukee. During the next 12 years he served as an assistant territory manager and as manager of the Northwest and Southwest territories.

He was appointed general sales manager in 1950, and vice president in charge of the Tractor Division in February, 1951. In July, 1952, Stevenson was appointed executive vice president of Allis-Chalmers. He is also a member of the executive committee of the board of directors.

He is a director of the National Safety Council and a member of the American Road Builders Association. He has served as a member of the Construction Machinery Advisory Committee for the National Production Authority.

Borg-Warner Acquires Brooks Eqpt. & Mfg. Co., Knoxville

Acquisition of BROOKS EQUIPMENT AND MANUFACTURING CO. by the Ingersoll Kalamazoo (Mich.) Division of BORG-WARNER CORP. has been announced. The Brooks company, whose plant in KNOXVILLE, TENN., makes a materials handling device, will be operated as a subsidiary of Borg-Warner.

President of the new subsidiary is J. H. INGERSOLL and R. F. SCHUTZ is vice president. An expansion of the Brooks operation is expected.

Two Goulds 2 x 3-9 Fig. 3305 two-stage centrifugal pumps on boiler feed service. These pumps are available in five sizes, with capacities to 1200 GPM, heads to 1000 ft.

These new pumps are designed to cut power plant maintenance costs

Eight special features, designed to insure maximum efficiency and long life, are *standard* in these new Goulds Fig. 3305 two-stage centrifugal pumps.

When you specify these pumps you get, *without extra cost:*

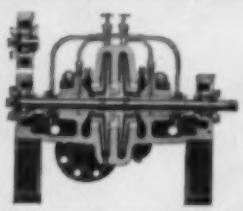
1. **Renewable stuffing box bushings.**
2. **Bearing housings sealed against moisture and dirt.**
3. **Cowl-type glands suitable for use with quenching liquids.**
4. **Stainless steel impeller keys.**
5. **Teflon water-seal rings.**
6. **Die-formed stuffing box packing.**
7. **Corrosion-resistant gland bolts.**
8. **Unique labyrinth diaphragm which maintains thrust balance.**

Every one of these features means less maintenance expense for you—less down time of vital equipment in your plant.

And that's not all, for the Fig. 3305 pump offers several other advantages, too. For example, you can choose either a conventional stuffing box or a mechanical seal, to suit your requirements, and you can change from one to the other at any time. Also, the exclusive Goulds patented locking shaft sleeve permits you to change the direction of rotation in the field, without additional parts.

Furthermore, if you use a number of pumps in your plant, the extensive standardization of parts enables you to keep your parts inventory low. Not only are many of the parts interchangeable within the various five sizes of the Fig. 3305 pump, but many parts also are interchangeable with those of the Goulds Fig. 3405 single-stage, double-suction pump.

Send the coupon below for Bulletin 722.6, which gives the complete story of the Fig. 3305 advantages, including specifications, performance curves, and interchangeability charts.



Cross section drawing of Fig. 3305 two-stage centrifugal pump.

GOULDS PUMPS, INC., Dept. SP-6, Seneca Falls, N. Y.

Please send me Bulletin 722.6 giving details and specifications of Fig. 3305 two-stage centrifugal pumps. I understand that this places me under no obligation.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Goulds PUMPS INC. Seneca Falls, New York

Atlanta • Boston • Chicago • Houston • New York
Philadelphia • Pittsburgh • Tulsa

"Our Welding Machines were repeatedly being shutdown . . *until we changed to Fusetron Fuses*"

"They eliminated production losses due to needless fuse blows."

"Our service shop is headquarters for the Detroit area of Fruehauf's operation. Trucks, tractors and trailers come in for repairs.

"As you know, motor carriers don't make money if they aren't hauling freight. It's our job to have the equipment rolling — and fast!

"But we were having trouble with shutdowns. Ordinary 60 ampere fuses were constantly blowing on our welding machines. We have 12 of these machines — that can be connected to 60 ampere switches located throughout the shop.

"Since many major repair jobs require welding, these shutdowns were really a serious problem for us.

"In an effort to avoid these shutdowns, we installed Fusetron fuses. Since changing, there hasn't been any needless fuse blowing on the welders. Fusetron fuses completely eliminated the trouble."

Clyde Parkins CHIEF ELECTRICIAN
Detroit Branch • Fruehauf Trailer Company, Detroit, Mich.

EVERYONE IN THE PLANT CAN BENEFIT BY USING FUSETRON *dual-element* FUSES.

FUSETRON is a trademark of the Bussmann Mfg. Co.

To Electrical and Safety Engineers
Fusetron Fuses Offer Maximum Safety

The 100,000 amp. interrupting rating of Fusetron fuses is apace with the high capacities of today's network systems — and they are adequately safe to meet future circuit growth.

Fusetron fuses reduce the expense of damaged equipment and the danger of fire and other hazards that can result from electrical faults because — they protect against short-circuits, harmful overloads and single phasing.

To Production Engineers
Fusetron Fuses Offer Increased Production

Down-time is reduced, because Fusetron fuses wipe out needless blows caused by harmless overloads or excessive heating of panels or switches.

HERE'S WHY FUSETRON FUSES GIVE ALL-PURPOSE PROTECTION

A fuse link combined with a thermal cutout — the result, a fuse with tremendous time-lag and much less electrical resistance and an interrupting rating in excess of 100,000 amps.

They have the same degree of Underwriters' Laboratories approval for both motor-running and circuit protection as the most expensive devices made.

Made to same dimensions as ordinary fuses, FUSETRON Fuses fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere, both 250 and 600 volt types. Also in plug types for 125 volt circuits.

Their cost is surprisingly low.

Write for bulletin FIS.

To Maintenance Engineers
Fusetron Fuses Offer Savings in Time and Work

Once properly installed, Fusetron fuses require no periodic inspection or down-time necessary on mechanically operated devices.

They protect against irritating interruptions of regular maintenance caused by needless blows. Unnecessary repair work is reduced because — if trouble occurs, Fusetron fuses open and warn of danger before motors or equipment are damaged.

Panels and switches are protected against damage due to poor contact heating.

To Top Management
Fusetron Fuses Offer Reduced Costs

Fusetron fuses cut maintenance costs because they are maintenance free — they increase life of equipment by guarding against damage caused by electrical faults — and they lower production costs by eliminating shutdowns due to needless blows.

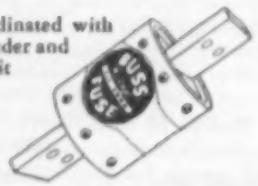
They save waste of space and money by permitting use of proper size panels and switches, instead of oversize.

FOR LOADS ABOVE 600 AND UP TO 5,000 AMPS . . . USE BUSS HI-CAP FUSES . . .

They have unlimited interrupting capacity to handle any fault current regardless of system growth.

They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.

Write for bulletin HCS.



Play Safe! install Fusetron and BUSS Hi-Cap Fuses throughout the entire Electrical System.

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

BUSSMANN MFG. CO. (Division of McGraw Electric Co.)
UNIVERSITY AT JEFFERSON ST. LOUIS 7, MO.

New Orleans Public Service Receives Edison Inst. Electrification Award

NEW ORLEANS PUBLIC SERVICE, INC. was one of the winners of the More Power to America Award for encouraging electrification of industry during 1954, it was announced recently at the sales conference of Edison Electric Institute in Chicago.

Shown when the awards were presented, l. to r., are S. F. DIFFENDERFER, manager, industrial sales department, Pennsylvania Power and Light; JOHN F. MORTON, industrial sales manager, New Orleans Public Service, Inc.; KARL RUNKLE, General Electric Company which sponsors the award; and HARRY RESTOFSKI, vice-president, West Penn Power Company and chairman of the EEI Prize Awards Committee.

The awards are designed to increase productivity of American industry by encouraging industrial electrification activity among electric utility operating companies.

G-E Builds New S.C. Plant

THE GENERAL ELECTRIC COMPANY has announced that it will build a $6,400,000 plant at Irmo, S. C., for manufacture of capacitors used in radio and television receivers.

Alfred W. Hough, General Manager of the G-E Capacitor Department, Hudson Falls, N. Y., said the plant will eventually employ about 700 persons. Construction will begin "almost immediately," and limited production is scheduled to begin early in 1956.

"The growth of color television," said Mr. Hough, "will bring a greatly-increased market for aluminum electrolytic capacitors which this new plant will manufacture. Our market forecasts indicate that, by 1960, nine million color receivers will be sold annually."

Color TV sets require at least twice as many of these capacitors as black-and-white models.

The 135-acre plant site is nine miles northwest of Columbia situated between County road S-40-42 and the Saluda River. A hydro-electric generating station of the South Carolina Gas & Electric Company is located nearby and will supply the large power demand.

The plant will consist of a one-story main manufacturing building, an auxiliary manufacturing building and service structures. The main building will provide 100,000 square feet of floor area, of which 85,000 square feet will be for manufacturing space and the remainder for offices. An additional 5,000 square feet of manufacturing area will be provided in the auxiliary building.

Because of the necessity of maintaining several types of "indoor climate" in the main manufacturing building, it will be a windowless structure providing maximum effectiveness from a complete air-conditioning system.

Architects for the new plant are Robert & Company Associates of Atlanta, Georgia.

In the South

Low Temperature EUTECTIC WELDING ALLOYS

SPECIAL EUTECTIC WELDING SERVICE DEPARTMENTS

are maintained by these leading distributors

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The Cameron & Barkley Co.
Phone: 7661

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Phone: 6-1155

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The Parts Company
Phone: 2-3631

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Bryant Supply Co., Inc.
Phone: UN 5-3466

GREENWOOD, S. C.
Dixie Hardware & Mill Supplies, Inc.

JACKSON, MISS.
Capitol Welding Supply Co.
Phone: 4-7640

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The Cameron & Barkley Co.
Phone: EL 6-0211

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Southern Auto Supply Co.
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Tennessee Mill & Mine Supply Co.
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Phone: 5-8745

MIAMI, FLA.
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Nunn's Battery & Electric Co., Inc.
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R. H. Chilton Co., Inc.
Phone: 4-1671

NEW ORLEANS, LA.
C. T. Patterson Co., Inc.
Phone: Raymond 4211

OPELIKA, ALA.
Opelika Equipment Co.
Phone: 704-705

ROME, GA.
Southern Auto Supply Co.
Phone: 2-1577

SAVANNAH, GA.
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Originators not Imitators

"Every kind of imitation speaks the person that imitates as inferior to him whom he imitates, as the copy is to the original."

LORD SOUTH

R. D. WASSERMAN

In every age, in welding and every other industry, you will always find those whose only claim to fame for their product is that it is "just as good."

More than 50 years ago, J. P. H. Wasserman, a Swiss metallurgist, pioneered a new welding process. He blazed a trail that others have tried to follow. Relentless research following his discovery has perfected Eutectic's "Low Heat Input" metal joining process which provides the high strengths of fusion welding using the lower heats associated with brazing.

Eutectic's research has never been equalled. Very simply, that is why no welding material imitating Eutectic "Low Temperature Welding Alloys"® can be "just as good" or produce equal results and savings.

Year after year, "Eutectic" has originated new and ever better welding alloys to make the weldor's job easier and more profitable. The rapidly increasing preference for Eutectic "Low Temperature Welding Alloys" in over 87,000 American industries is proof of Eutectic's leadership. It is testimony that the American weldor is too smart to be fooled by imitations. The American weldor realizes the importance of getting all the advantages of Eutectic's "Low Heat Input" metal joining process—the elimination or minimization of overheating, warping, distortion, embrittlement and other dangers to base metals.

To the weldor, Eutectic's process means "Better, Faster, Cheaper" welding. To industry everywhere, "Eutectic" has made welding more profitable, with an ever-widening field of application for production, maintenance, and salvage of metals and metal products.

A FEW "EUTECTIC" FIRSTS
1940-1955

U.S. Patent #2,583,163. Surface alloying process for bonding metals.

U.S. Patent #2,288,869. First Torch Alloy for joining cast iron with color match, without fusion.

U. S. Patents #2,358,813, #2,410,850, #2,544,000. First metallic film coating to enhance Surface Alloying.

U. S. Patents #2,279,282, #2,279,283, #2,279,284. First nickel bearing copper alloy for high tensile joining.

U.S. Patent #2,481,053. First torch alloy and flux for joining high aluminum content metals.

U.S. Patent #2,471,803. First "Low Amp" coating for metal arc welding of cast iron.

U.S. Patent #2,632,000. First low-melting electrode for high tensile strength joining of aluminum.

U.S. Patent #2,632,835. First "Low Amp" electrode coating for high alloy steels.

U.S. Patent #2,626,339. First electrode for high tensile strength joining of copper.

RESEARCH—BACKBONE OF PROGRESS

During the past 50 years Eutectic Welding Alloys Corporation has learned much. It is possible for imitators to analyze our welding rods, electrodes and fluxes. But originating and producing them is an achievement only "Eutectic" can claim. Only the long, hard road of doing it can provide the answers.

The time spent in imitation is lost, for long before a "copy" can be made, Eutectic's research has perfected other new and improved materials.

Today, in Eutectic's own research centers throughout the world, teams of metal experts create and test newer and better products for metal joining. And, in its own up-to-the-minute plants, meeting rigid standards of quality, "Eutectic" turns these research products into "Low Temp" EutecRods and "Low Amp" EutecTrodes that bring the benefits of "Low Heat Input" metal joining into shops everywhere.

ORIGINATORS NOT IMITATORS

The research behind this phrase is your assurance of the most modern welding materials known. It is your assurance that you are applying advanced "Low Heat Input" metal joining techniques to your critical work and that you have the most modern developments at your fingertips.

Don't be fooled by those who tell you that any ordinary rod or electrode is "just as good." Nothing can match Eutectic "Low Temperature Welding Alloys" performance.

Remember, it is the quality of the finished job and the ease and speed with which you do it that determines real economy, and not a few pennies difference in original cost. Because of its research facilities, only Eutectic Welding Alloys Corporation gives you true "Low Heat Input" metal joining and helps you eliminate the risks of dangerous overheat overheating and the subsequent distortion and damage to base metals. And that, after all, is what you are always after.

READY TO PROVE WHAT WE SAY

To bring you all the benefits of Eutectic's research, our District Engineers are ready to go right into your shop to show you how Eutectic "Low Temperature Welding Alloys" will solve your welding problems. Your Eutectic District Engineer will show you how the same electrode holder or torch you use with conventional materials gives you "Better, Faster, Cheaper" welds with "Low Temp" EutecRods and "Low Amp" EutecTrodes . . . with substantial savings in work, time, gas and welding materials.

YARDSTICK OF PERFORMANCE

To help you select from among the more than 160 EutecRods and EutecTrodes those that will give you largest savings per job, write for your free copy of our new 32-page DirectoRod Guide. Whatever your welding problem—production, maintenance or salvage, there's a EutecRod or EutecTrode to do the job faster, better, and cheaper. Use the convenient coupon below.

SYMBOLS OF DEDICATION

These seals denote our proud contribution to American industry: 15 Years of "Golden" Savings, 50 Years of Research. These years have seen many great achievements. And, for the future, we look forward to ceaseless weldgineering and the continued application of Eutectic's research to your service.

President, Founder, Director of Research

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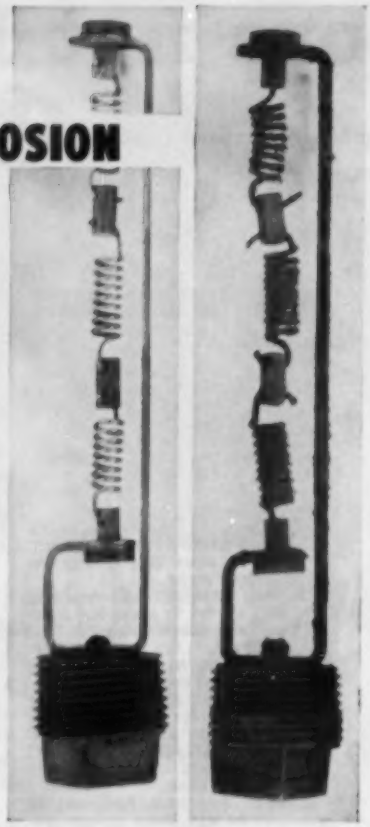
HERE'S HOW RETURN LINE CORROSION REDUCES POWER PLANT EFFICIENCY...



Return line corrosion is one of the most critical problems in maintaining economical, efficient power plant operation. To demonstrate what corrosion can do in steam and condensate return lines, we show here "before" and "after" unretouched photographs of N.D.H.A. Corrosion Testers. This is a test* developed by the American Society for Testing Materials in cooperation with the National District Heating Association. Bird-Archer supplies and analyzes these testers. Photo at left shows a Tester before installation. Photo at right shows a Tester after it had been installed for 60 days in the return line. (*Standard Method of Corrosivity Test of Industrial Water, NDHA Method, ASTM Designation 935-49).

HERE'S HOW YOU CAN ELIMINATE THIS WASTE WITH AMINE TREATMENT

Bird-Archer Amine Treatment is an easy, effective and economical way to eliminate corrosion troubles. Amines raise the pH value of the return condensate to the point whereby the corrosion potential is negative. In addition, amines provide a surface protection for the metal itself which further inhibits corrosion. In scores of plants, Bird-Archer Amine Treatment is paying a profit on its cost through savings in piping replacement and maintenance work.

WRITE FOR
BULLETIN CP-100
AND THE NAME OF THE BIRD-ARCHER SERVICE ENGINEER NEAREST YOU.

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WATER TREATMENT

THE BIRD-ARCHER COMPANY, 4337 N. AMERICAN ST., PHILADELPHIA 40, PA.
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IN CANADA: The Bird-Archer Co., Limited, Cobourg, Ontario
BIRD-ARCHER COMPANY OF CALIFORNIA, San Francisco

Harry M. Spring Joins Mathis Water Treating Co.—Tenn.

JAMES C. MATHIS, president of MATHIS WATER TREATING COMPANY, P. O. Box 1086, KNOXVILLE, TENNESSEE, recently announced that HARRY M. SPRING, JR., has joined that company as chief engineer.

Mr. Spring, a consulting engineer, has just returned from a two-year tour of mechanical engineering and boiler inspection for a central power company and the Alaskan Air Command in Alaska. Prior to that he was associated for 19 years with a leading boiler insurance company (the last five years in the position of chief inspector). He is a member of the American Society of Mechanical Engineers, American Society for Metals, Non-Destructive Testing Society, and other engineering groups.

In addition to the usual materials for combatting algae and slime in cooling towers, air washers, and screens, Mathis Water Treating Company has had under study and tests for several months a new application of a metallic salt. This has developed to the point where it is capable of the complete removal and deactivation of organisms in a matter of hours, without any chance of corrosion in the system or danger to personnel.

The company also has an excellent boiler water conditioning program for scale and corrosion control, foaming, steam and return line problems; embrittlement investigations, and other specialized problems.

Presently, this company is providing such services in Tennessee, North Carolina, South Carolina, Georgia, Virginia, Kentucky, Alabama, and West Virginia.

Frequent visits are made to check conditions, to analyze water, for inspections, and to make engineering investigations.

Automatic Transportation—Kansas City Representative

Appointment of KORNFELD - THORP ELECTRIC COMPANY, KANSAS CITY, Mo., as a franchise representative, has been announced by the AUTOMATIC TRANSPORTATION COMPANY, 149 W. 87th St., Chicago.

The Kansas City firm was given a territory comprising Kansas and Western Missouri. H. ORVILLE THORP and H. B. R. ALLEN have been assigned by the firm to sales and service of Automatic equipment for industrial and institutional accounts in the area with service on a 24 hour basis.

News (continued)

Reynolds Metals Elects Three Vice Presidents

REYNOLDS METALS COMPANY has recently elected three vice presidents. C. E. COGHILL, treasurer of the company, was made vice president and treasurer. JOHN KREY, assistant to the president, was made vice president. W. MONROE WELLS, assistant vice president of operations, was made vice president.

Mr. Coghill was born in Roanoke, Virginia, and attended Virginia Mechanics Institute. He joined the accounting firm of Ernst and Ernst, from which he came to Reynolds in November, 1939. He was appointed treasurer in 1948.

Mr. Krey was formerly with Reynolds & Co. on Wall Street, of which R. S. Reynolds, Jr., was a partner. In 1941, Mr. Krey became associated with Reynolds Metals Company as assistant treasurer. When Mr. Reynolds became president of the company in 1948, Mr. Krey was made assistant to the president, which position he has held up until the present time.

Mr. Wells was born in Maryville, Tennessee. After approximately 28 years in the aluminum industry, he joined Reynolds Metals Company in 1946. He was elected assistant vice president in 1953. In October, 1954, Mr. Wells was made a vice president of Reynolds Reduction Company, a wholly owned subsidiary of Reynolds Metals.

Alco Expanding Texas Exchanger Fabrication

THE AMERICAN LOCOMOTIVE COMPANY recently announced that it has acquired the Carter Craft fin tube process, a new method of heliarc welding longitudinal fins to tubes for use in heat exchangers. The company has also announced production of a new line of fin tube heat exchangers for the petroleum, chemical, petrochemical and power industries, which employ the advance-design tubes in their construction.

Alco has purchased the entire fin tube business from the Dallas, Texas firm, including Carter Craft's inventions, know how, good will and fin tube fabricating equipment, and has already commenced moving the apparatus to its BEAUMONT, TEXAS, plant. Here the company is establishing a complete manufacturing center for fin tube products. Present plans are to expand the former Carter Craft equipment to produce tubes large

TO KEEP COSTS DOWN

KEEP PRODUCTION UP

WITH MANZEL FORCE FEED LUBRICATION

Pressure Application — Exact Amounts — Accurately Timed

Manzel Force Feed Lubricators insure efficient machinery operation by lubricating automatically. No stops for hand oiling — or because of breakdowns caused by faulty lubrication. They

quickly pay for themselves through savings in down time, labor and lubricants.

These sturdy, dependable lubricators can be installed on new or existing equipment. Write for details.

Manzel

DIVISION OF FRONTIER INDUSTRIES, Inc.
318 BABCOCK STREET, BUFFALO 10, NEW YORK

DIXISTEEL merchant bars are quality-controlled from start to finish. At each step of production — from molten steel to the finished hot-rolled product — checks and rechecks are made to assure proper physical properties, finish and tolerances.

DIXISTEEL Bars and Shapes are produced in a wide variety of shapes, sizes and grades — plain or galvanized.

Write today for complete information and prices.

Atlantic Steel Company

ATLANTA, GEORGIA

Producers of fine-quality low-carbon steel products, including: hot rolled bars, shapes and strip • drawn wire • nails, rivets, staples • fence and barbed wire • fabricated reinforcing bars • forgings and stampings

enough to meet foreseeable market needs, to install new automatic tube cleaning and handling equipment and to purchase additional machinery for the production of Alco's new line of standardized fin tube heat exchanger sections.

With the completion of the new production facilities, Alco expects to concentrate its fin tube marketing and manufacturing effort in the Southwest.

Alco's standard fin tube heat exchanger sections consist of a double-pipe arrangement of the company's new finned tubes, and are designed to give exceptional service where the conventional bare-tube heat exchanger is unsuited, or where the fluid being heated or cooled has an appreciably higher resistance to the exchange of heat than the fluid used for heating or cooling. The sections will be offered in a variety of sizes, lengths, materials and pressures.

Especially built for heavy-duty service where corrosion or contamination is a factor, the new fin exchanger is highly adaptable to changing load requirements and changes of duty within a given plant. Tubes from individual units may be withdrawn without displacing the connecting pipe—even when units are installed in banks with interconnecting piping. Removal is made possible by elimination of the split ring at the tube-to-shell joint.

New Vepco Station—Yorktown

VIRGINIA ELECTRIC AND POWER COMPANY will build a power station at a new location on the York River, near Yorktown, to utilize the by-product fuels to be produced by the new American Oil Company refinery. One of a very few such installations in the country, it is the result of negotiations between the two companies to make the best possible use of by-product fuels.

Construction of the station, estimated to cost over $20,000,000, will start at once, with completion planned by July 1957. The power station site will be conveyed to Vepco by the American Oil Company.

The first unit to be installed will be the largest steam turbine generator on the Vepco system, with a capability of 160,000 kw, six times as large as the total capacity of the Hampton station. The boilers are being especially designed to operate at 2,000 pounds pressure, and to burn petroleum coke and refinery gas, to be supplemented by coal, or oil. Ample land is available for anticipated future expansion.

News (continued)

Childers Representatives—Tulsa and Kansas City

CHILDERS MANUFACTURING CO. of HOUSTON, TEXAS, has recently appointed two new engineering representatives, according to BOB CHILDERS, president.

THE JOHN P. DOBBINS CO. of TULSA will act as engineering consultant and sales representative for Childers aluminum weather-proof jacketing in OKLAHOMA.

THE D. M. ALLEN CO., 3021 Main St., KANSAS CITY 8, MISSOURI, will represent Childers in Kansas and Western Missouri.

Childers jacketing is distributed nationally as a weather-proof covering for insulated lines, towers and vessels.

Elliott Company—Atlanta

ELLIOTT COMPANY, Jeannette, Pa., recently announced the appointment of F. L. HUMPHREY, JR., as district manager in their ATLANTA territory.

Mr. Humphrey joined the company in 1928 following his graduation from Georgia Institute of Technology as an electrical engineer. After completion of the Elliott training program, he was assigned to their Atlanta office as a field engineer. Entering the army in 1942, he served for four years, returning to the Atlanta office in 1946, and becoming assistant district manager in 1954.

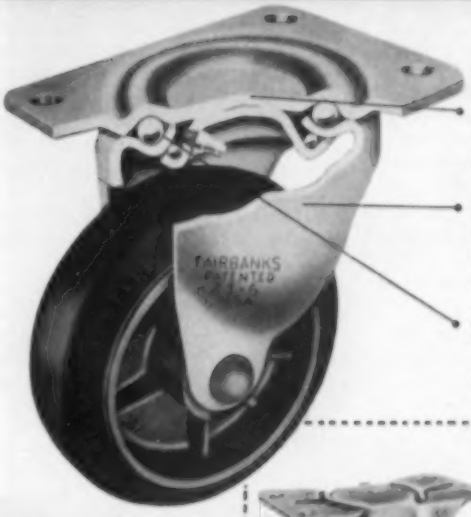
Texas Eastern—Shreveport

W. M. STEPHENS has been appointed acting superintendent of construction for TEXAS EASTERN TRANSMISSION CORPORATION, SHREVEPORT, LOUISIANA, according to B. D. Goodrich, vice president and chief engineer. Mr. Stephens, an engineer for Texas Eastern since 1950, will supervise the activities of the communications, compressor station, electrical, materials and pipeline sections of the company's engineering department.

Before joining Texas Eastern, Mr. Stephens was employed as an engineer with Brown and Root of Houston. A professional engineer since 1927, Stephens has been associated with the Construction Service Company of Houston, Hudson Engineering of Houston, Pan American Refining, Sinclair Refining, Humble Oil Company and Gulf Refining Company.

A native of Louisville, Mississippi, Stephens was graduated from Texas A. & M. College with a degree in engineering.

ACHIEVEMENT
IN CASTER DESIGN
FAIRBANKS
"LOCKWELD" Swivel Casters — Without King-Pin!



CHECK these unmatched advantages:

- No King-Pin. Patented "LOCKWELD" construction eliminates the major cause of caster failures.
- Patented leg design—spherical shape provides greater strength through better dispersion of shocks and overloads, easier swiveling under load.
- Larger raceways and ball bearings — perfectly aligned by the rigid welded structure — give faster, easier swiveling action.

Fairbanks Series "23" double ball race swivel casters, for medium duty, sizes 3" to 8".

Fairbanks Series "33" rigid casters, match Series "23" casters in height, sizes 3" to 8".

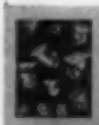
Fairbanks Series "21" single ball race swivel casters, for regular duty, sizes 2" to 6". Matching rigid Series "31" casters available.

HEAVY DUTY STEEL CASTERS

Fairbanks Series "27" double race swivel casters, for heavy duty, sizes 6", 8" and 10".

Fairbanks Series "37" rigid casters match the Series "27" casters in height, sizes 6", 8" and 10"

Fairbanks Series "500" Vulcanized Rubber Tired Wheels, roller bearing, sizes 3" to 18". Standard of the industry.



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Order Fairbanks products through your local distributor who is always ready to serve you.

THE Fairbanks COMPANY

393 Lafayette Street, New York 3, New York
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Valves • Truck • Casters • Wheels • Dust & PIC Unions

News for the South and Southwest (continued)

New Sarco Agent—Carolinas

SARCO COMPANY, INC., Empire State Bldg., New York, has announced the appointment of HOFFMAN & HOFFMAN COMPANY as its new sales representative in North and South Carolina.

Sarco manufactures steam traps, temperature regulators, heating specialties and Sarcotherm weather compensated control systems.

The new Carolina sales agent has offices in GREENSBORO, N. C., RALEIGH, N. C., and COLUMBIA, S. C.

New A-C Branch—Texas

Appointment of R. H. GODEKE as manager of a new ALLIS-CHALMERS GENERAL MACHINERY DIVISION branch office in the Medical-Professional Building in CORPUS CHRISTI, TEXAS, has been announced by J. L. PRATT, manager of the company's southwest region.

Godeke, a mechanical engineering graduate of Texas Technological College, had been a representative in Allis-Chalmers San Antonio district office since December, 1947. He joined the company in 1940.

Perfecting Service Co., N. C.

PERFECTING SERVICE COMPANY of Charlotte, announces the recent purchase of the PRECISION GEAR & MACHINE COMPANY of CHARLOTTE, NORTH CAROLINA, which will be a division and wholly owned subsidiary. All the present employees will remain. Additions to the staff are sales manager, C. B. BOOKOUT; and plant manager, EVERETT ALLEN.

Precision Gear Company has been a leading manufacturer of gears, transmissions and bearing equipment for the textile industry and precision fine gears for general industry, throughout the Southeast, for over 27 years. The officers state that they plan to expand operations and facilities to better serve the rapid growth of the industrial South.

Perfecting Service Company manufactures a number of industrial products such as the Rotary Union, a patented rotating steam connection for textile machinery and other industrial processing equipment. Other products manufactured are universal steam traps, air control equipment, quick couplings and flexible metal hose.

Chromalox—Tenn. & Ala.

EDWIN L. WIEGAND COMPANY, Pittsburgh, Pa., announces the appointment of HAROLD MILES AND ASSOCIATES, 424 Georgia Ave., Chattanooga 2, Tenn., as Chromalox sales engineering representatives in TENNESSEE and in ALABAMA north of the Tennessee River.

Mr. Miles, an electrical engineering graduate of Ohio State University, has been associated with the electrical heating field since 1937. He was sales manager of industrial heating equipment for Chromalox for several years before joining C. B. Rogers & Associates of Atlanta, the company's Southeastern representatives.

Vulcan Steel Container Co., Alabama, Appoints Donoher

GORDON D. ZUCK, president of VULCAN STEEL CONTAINER CO., BIRMINGHAM, ALABAMA, has announced the appointment of DAN DONOHER as New York representative with headquarters in Bloomfield, N. J.

Mr. Donoher, a graduate of the University of Buffalo, started in the container business in 1940 and has had wide experience, including three years in the NEW ORLEANS area.

● Whatever your needs in pressure vessels—gas storage tanks, pressure spheres, creosoting cylinders, bubble towers, gas scrubbers, etc.—you can depend on COLE for tanks that are correct in design and permanently leakproof at the welded or riveted joints.

HIGH-PRESSURE VESSELS

R. D. COLE Manufacturing Co., Newnan, Ga.

- TANKS
- TOWERS
- CYLINDERS
- VESSELS
- STANDPIPES

COLE can furnish tanks made of steel, aluminum and stainless steel—built in accordance with ASME Code—to meet all insurance requirements. We invite your inquiries for high pressure storage tanks, elevated tanks, acid or oil storage tanks, bins, boilers, stacks, etc.

News (continued)

Atlantic Regional Mgr.—Gould-National Batteries

The appointment of GEORGE P. MILLINGTON as Atlantic Regional Manager of the Industrial Division has just been announced by GOULD-NATIONAL BATTERIES, INC. Millington will continue the regional headquarters at 1026 Beury Building, 3701 North Broad Street, Philadelphia. MARYLAND, VIRGINIA and WASHINGTON, D. C., are included in the Atlantic region.

Worthington—St. Louis

J. H. LOOMIS has been appointed manager of WORTHINGTON CORPORATION'S ST. LOUIS office after previously serving as general line salesman and compressor specialist at the Worthington Chicago District Office.

P. A. MACK, former manager of the St. Louis office, has been appointed special representative in which capacity he will devote his full time to the development of business through special customers and assignments. Associated with Worthington Corporation for 40 years, Mr. Mack served as manager of the St. Louis office for 23 years prior to his present appointment.

North Brothers Distributor for Forty-Eight Insulations

NORTH BROTHERS, Boulevard at 8th St., N. E., ATLANTA, GEORGIA, have recently been appointed distributors for FORTY-EIGHT INSULATIONS, INC., Aurora, Ill. Products include mineral wool cement, mineral wool block and blanket.

Branch offices of North Brothers are located in SAVANNAH, GA.; COLUMBIA, S. C.; KNOXVILLE, TENN.; ORLANDO, FLA., and BIRMINGHAM, ALA.

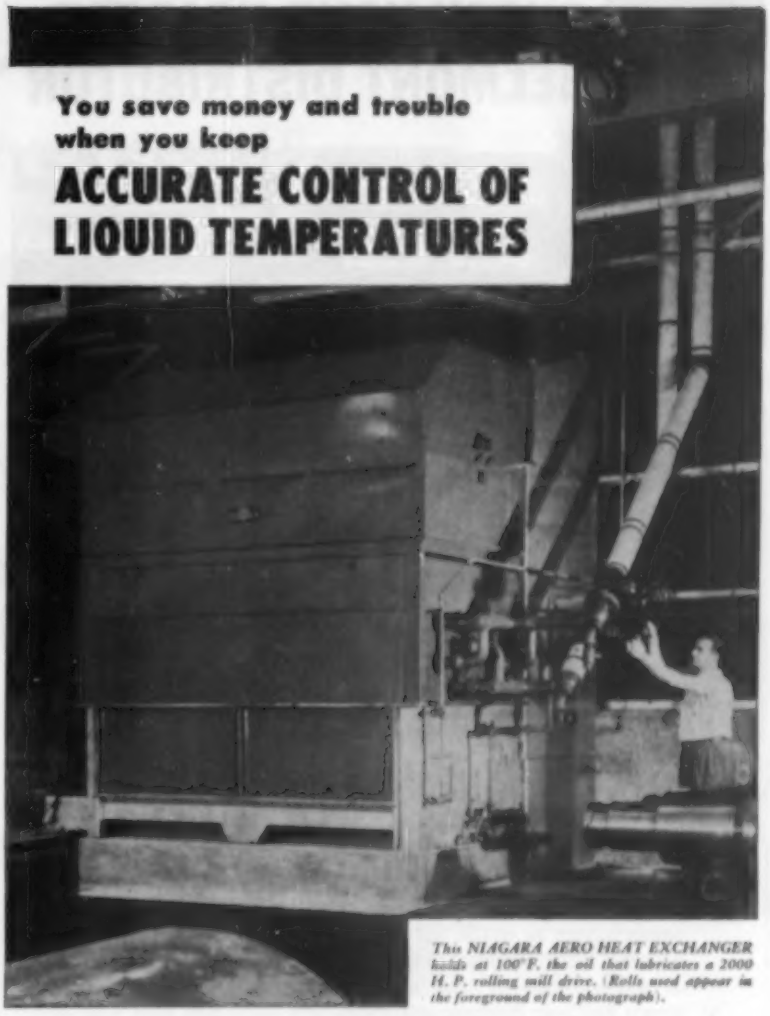
Avisco Promotes Ruff, W. Va.

ALBERT G. RUFF, JR., has been promoted to the position of assistant manufacturing superintendent at the NITRO, WEST VIRGINIA, rayon plant of the AMERICAN VISCOSE CORPORATION.

Mr. Ruff joined Avisco in 1941, as a chemical engineer at the Roanoke, Virginia, plant. He was promoted to the position of spinning department head in 1943. Mr. Ruff has also held the position of assistant to the personnel manager, and in 1954 was appointed staff assistant to the plant manager.

You save money and trouble when you keep

ACCURATE CONTROL OF LIQUID TEMPERATURES



This NIAGARA AERO HEAT EXCHANGER holds at 100°F. the oil that lubricates a 2000 H. P. rolling mill drive. (Rolls used appear in the foreground of the photograph).

The Niagara Aero Heat Exchanger uses atmospheric air to cool liquids and gases by evaporative cooling, removing the heat at the rate of input, controlling temperatures precisely. You save 95% of the cost of cooling water. You get great saving in piping, pumping and power, quickly getting back the cost of the installation.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S. P., 405 Lexington Ave. **New York 17, N. Y.**

Niagara District Engineers in Principal Cities of United States and Canada

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He'll Solve Your Packing Problems...Pronto

Belmont Packings . . . compounded like a doctor's prescription . . . answer the individual packing needs of industry.

There's no cure-all in the Belmont Line; every style, every construction is made for some specific SEALING service. Belmont Packings seal better, last longer because six decades of experience—in just making packings—stands behind every Belmont Recommendation. Try them and see!

The nearest Belmont Distributor will supply your needs from ample local stocks. He'll save you money on warehouse and transportation costs. You can buy large or small quantities as needed. His service facilities reduce buying and accounting costs. And he'll help to keep your equipment and machinery *SEALED* and running smoothly. Get the packing in the blue box with a flock of orange trade-marks.

When it SEALS right—stays TIGHT . . . you know it's Belmont made!

4-R-3

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Without obligation — send us information as checked:

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- ☐ #54 Condensed Catalog
- ☐ Bel-Vee Packing Folder
- ☐ SEND NAME and ADDRESS of NEAREST BELMONT DISTRIBUTOR

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Company _____

Address _____

City _____ State _____

News (continued)

D. Glenn Sudderth Retires from Westinghouse—Atlanta

WESTINGHOUSE ELECTRIC CORPORATION announces the retirement of D. GLENN SUDDERTH, Southeastern Transportation Supervisor, ATLANTA, GEORGIA.

Mr. Sudderth has been associated with Westinghouse for thirty-eight years, having had many sales and engineering assignments in the railway, utility, and industrial fields. He pioneered the development and sales of diesel electric locomotives in the South.

After a vacation, he will be associated in Atlanta with Frank O. Walsh, Jr., as manufacturers agent.

Stephen C. May—Atlanta

STEPHEN C. MAY announces that his firm has moved to new offices at 3551 Ivy Road, N. E., ATLANTA, GEORGIA.

Mr. May is engineering sales representative for Warren Pumps, Elgin-Refinite Water Conditioning, Milwaukee Valves, Roningen Strainers, and other products.

Childers Appoints LaFave Manager of Jacketing Sales

Bob Childers, president of CHILDERS MANUFACTURING CO., HOUSTON, TEXAS, has announced the appointment of JOHN C. LAFAVE as manager of jacketing sales.

Mr. LaFave joins Childers after five years of service with the United Trading Stamp Co., where he had served as district manager of the midwest area since 1953. He is a graduate of the University of Minnesota, and also attended the Michigan College of Mining and Technology.

This appointment marks the beginning of an accelerated sales program for the company's aluminum weatherproof jacketing, which has achieved wide acceptance as a protective covering for inside and outside insulated lines.

Cook Electric Co.—Dallas

LOWELL J. CARR has joined COOK ELECTRIC COMPANY, CHICAGO, 14, ILLINOIS, as sales engineer, according to Charles H. Brunell, Sales Manager.

Mr. Carr will be attached to the company's Dallas office at 3415½ Milton Avenue, DALLAS, TEXAS. He was formerly sales engineer with Aero Engineering Company, Baltimore, Maryland.

Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

Rubber Expansion Joints

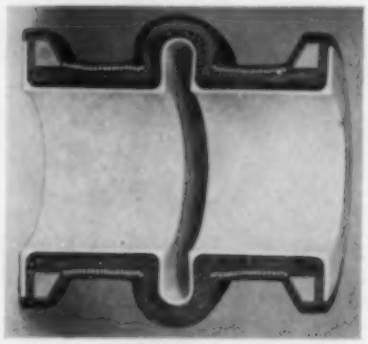
F-1 THE GARLOCK PACKING COMPANY, Palmyra, N. Y., has announced rubber expansion joints specially designed for use with piping and flanges made by Haveg Corporation and The Duriron Company, Inc.

These expansion joints are made of a high-grade rubber compound combined with plies of sturdy cotton duck and reinforced with steel wire. Steel rings are incorporated in the flange ends of the joint to permit tightening of the connections without shearing the expansion joint.

The company can supply these special expansion joints with neoprene lining if some oil is present in the line; with neoprene cover and neoprene lining if, in addition, the outside of the joint is in contact with oil; neoprene throughout if the line carries petroleum derivatives; and with Teflon liner if the line carries liquids or gases harmful to rubbers.

Known as Garlock 209 Expansion Joints, they are furnished for pipe sizes from 1 in. to 12 in. inclusive.

Garlock 209 rubber expansion joint with Teflon liner.



Pressure Atomizing Burner

F-2 THE IRON FIREMAN MANUFACTURING COMPANY, 3170 West 106th St., Cleveland 11, Ohio, has announced a new heavy-duty pressure atomizing commercial oil burner, with a capacity of 20-30 gallons.

The new burner, known as Model C-3, is approved for firing No. 2 or lighter oil. It features heavy-duty choke ring, rugged cast iron frame, sealed-for-life motor, and electronic combustion controls. The burners are designed to permit adjustment of the nozzle position while the burner is in operation, which readily allows setting of the burner for maximum combustion efficiency and for the most suitable flame shape.

The motor is totally enclosed and contains sealed friction-free bearings, factory lubricated for life. The motor is covered by a five year warranty.

Electronic-type safety controls are incorporated on all C-3 burners. An instantaneous cutoff and delayed opening valve on the fuel unit operates in conjunction with the safety control.

This 65' by 120' Armco Series P Building is used as a warehouse in Texas.

This 8' by 8' Armco Series S Building was installed by an Ohio power company.

These Industrial Buildings *GO UP FAST!*

Time is money, especially when industries have to wait while buildings are being erected. This is one reason why so many firms are turning to Armco Steel Buildings. They are shipped promptly and erected quickly.

ARMCO SERIES S BUILDINGS meet smaller structure requirements. They are supplied in clear-span widths from 4 to 40 feet, in a choice of heights, and almost unlimited lengths. Assembly is by fitting interlocking STEELOX panels together. Unskilled crews can handle the whole job.

ARMCO SERIES P BUILDINGS are designed for larger building needs. Widths range from 30 to 100 feet, a selection of heights, and practically unlimited lengths. They have a steel framework covered by corrugated metal sheets.

Both types may be supplied as Multiple-Span Buildings. Either type may be extended or dismantled and re-erected without loss of material. There's nothing to crack, warp or rot. And steel won't burn. Write us for more data.

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DIXIE DIVISION
619 Forsyth Building • Atlanta, Georgia

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C & I Life Building • Houston, Texas

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Send me data on Armco Steel Buildings:

I'm interested in a building_____ feet wide by_____ feet long.

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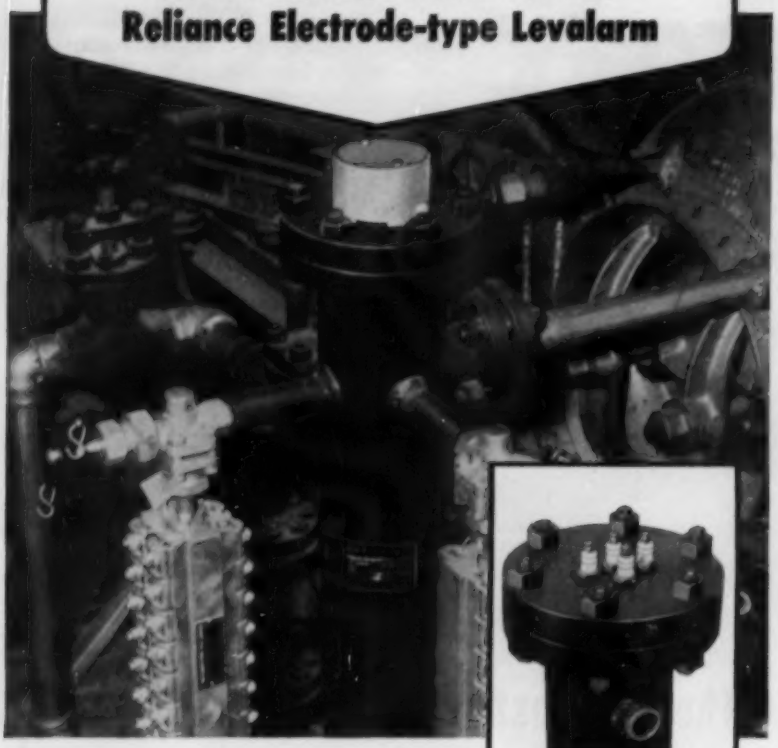
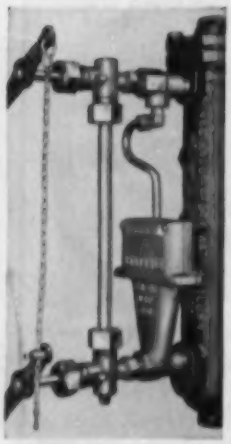
Small Device Does Big Job!
Here's all that shows of the Reliance Electrode-type Levalarm



Cap removed showing electrode connection fittings

Boiler water connects own alarm system and fuel cut-out . . .



Isolated circuits make relays work for you to actuate...

low water alarm — pump start
high water alarm — pump stop
fuel cut-out

(or selection of these facilities)

Upper photograph — Levalarm for pressures up to 1100 psi.

Lower photograph — Fuel cut-out Levalarm on low pressure water column.

Write for Bulletin D2.

The Reliance Gauge Column Company
5902 Carnegie Avenue • Cleveland 3, Ohio

The name that introduced safety water columns....in 1884

Reliance®

BOILER SAFETY DEVICES

new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

Portable Hoist Support

F-3 B. E. WALLACE PRODUCTS Co., Exton 20, Pa., has introduced the "Magic-Pole Unipod," a portable "skyhook" for use as a hoist support while lifting, shifting, or lowering equipment, at almost any location, either indoors or out.

The Standard Model (illustrated), easily supports 2000 lb, yet weighs just 22 lb. It can be closed to 6 ft 4½ in. for easy storage or convenient size to carry onto the job. On location, the Magic-Pole can be extended by 6 in. steps to 10 ft 2 in. Any position is positively held by a locking handle, which is secured by a chain to prevent loss. The hoist is kept clear of the Magic-Pole by a built-in outrigger.

Two high strength 20 ft guy lines are included as standard equipment. Though each line will support over 1 ton, actual requirements do not normally exceed 250 lb per line. Therefore, indoors the lines can easily be secured to posts or nearby machinery. Stakes are used outdoors.

The selling price, complete, is $31.80.

Emergency Generator Set

F-4 COPPUS ENGINEERING CORPORATION, 249 Park Ave., Worcester 2, Mass., announces a new line of packaged a-c single phase and 3 phase turbo gen-

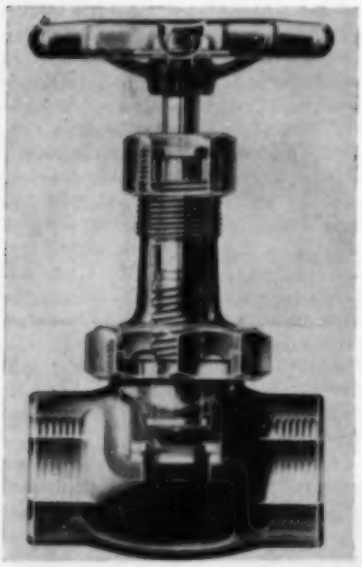
erator sets for emergency lighting or where dependable lighting or power supply is required.

They are compact ready-to-be-installed power units and require no switchboard. Ratings from 3.75 to 62.5 kva are available. Units consist of a Coppus type TF Steam Turbine with Constant Speed Governor, Excess Speed Safety Trip, Carbon Ring Glands, Sentinel Relief Valve and Steam Strainer.

Turbine is connected by a Falk Flexible Coupling to Electric Machinery Mfg. Co. packaged 1800 rpm generator with direct connected exciter and mounted control cabinet with voltmeter and ammeter. Unit is mounted on a welded structural steel base plate, with a sheet steel coupling guard provided for safety.

Bronze Globe Valve

F-5 THE LUNKENHEIMER Co., Box 360, Cincinnati 14, Ohio, has introduced a new bronze globe valve, the LQ600, which incorporates two outstanding new features.



Lunkenheimer's new bronze globe valve features flat-seat design and a new seating metal—Brinalloy.

The first is a new seating metal, patented by Lunkenheimer under the name, "Brinalloy." This new alloy is not surface-hardened, but hard all the way through. It resists wear and corrosion even more than 500 Brinell Stainless Steel and more than case-

Yes every DART is VACUUM-TESTED

(to give YOU a drop-tight seal)

This True Ball Joint Makes the Difference

Make it right . . . Test it after you make it . . . That is our rigidly adhered to policy at Dart. When you buy unions it's a good thing to remember because (1) You'll get a drop-tight union; (2) a union that can be used over and over again; (3) a union that's easy to install; (4) savings thru longer service.

QUICK FACTS

- Leakproof because precision-machined to a true ball joint and spherically ground
- Extra wide seats of bronze alloy resist pitting and corrosion
- Heavy shoulders that can take severe wrenching without damage
- Nut and body practically indestructible (of air refined, high test malleable iron)
- Individual vacuum testing of each Dart to assure absolute tightness when it leaves the factory

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Providence 5, Rhode Island
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hardened stainless steel exceeding 1000 Brinell.

The second element is the flat-seat design of the valve. Engineers have long considered flat-seat designs impractical for throttling service, because ordinary seating materials failed rapidly by wiredrawing. Brinalloy, however, is so resistant to wear and corrosion that it can be fused permanently into the valve for its entire service life. The Brinalloy seats and discs in the LQ600 valve do not require replacement, renewing, or regrinding.

The valve also has the Stemalloy stem, which eliminates valve failure from stem-thread wear. It is operated by the Lunkenheimer Non-Slip handwheel, which provides a comfortable, cool, firm grip, even when hands are wet or greasy. Other features include durable, high-strength bronzes in body and bonnet, and true backseating, permitting safe and easy repacking under pressure.

High Pressure Steam Packing

F-6 A. W. CHESTERTON CO., Everett 49, Mass., has developed a new steam valve-stem packing for pressures up to 1500 lb and temperatures of 1000 F.

Long fiber asbestos yarn is combined with high tensile strength, fine filament monel insertion. A high temperature lubricant that will not pit stainless steel stems is incorporated. The packing, known as Chesterton 1000 F, is claimed to be successfully in service under severe conditions on stationary and throttle valves. It will not boil out or shrink and has good compressibility and recuperative powers.

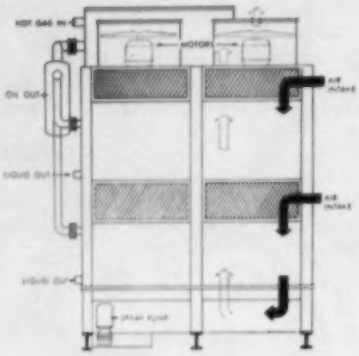
Cable for Hot Locations

F-7 THE OKONITE COMPANY, Passaic, N. J., is offering new Okotherm - insulated, aluminum-sheathed cable designed for continuous operation at 150 C and up to 200 C under certain conditions.

Available for both power and control cable circuits, it provides an extra labor-saving advantage through its own built-in aluminum conduit. The main advantages are flame and heat resistance; no conduits and related "pulling-in" problems; moisture and ozone resistance; space-saving small diameter; light weight for easy handling; high dielectric strength; and corrosion resistance.

Industrial Refrigeration

F-8 THE NIAGARA BLOWER COMPANY, 405 Lexington Ave., New York 17, N. Y., announces a new, 200-tons-refrigeration capacity ammonia condenser as an addition to its line of high capacity industrial and commercial refrigeration installations of from ten to 400 tons in single units of convenient size.



The basic principle is that of evaporating sprayed water from the surface of condensing coils through which the refrigerant gas passes, extracting heat at the rate of 1000 Btu per pound of water evaporated. The air stream enters at the top of the condensing section, is drawn downward through the water sprays, over the condensing coils, and then turns upward to leave the unit through propeller-type fans at the top. This reverse direction air stream is a departure from previous practice and is a new, patented feature which increases the capacity of the unit and greatly reduces the outlay for electric power. The spray water falls into a tank at the base of the unit, from which it is recirculated, with a net water consumption of less than 5% of the water used by submerged coil type condensers of equal capacity. The equipment is protected from freezing.

In addition, the unit is equipped with the Niagara "Duo-Pass" precooling coil which removes the superheat from the refrigerant gas making it close to condensing temperature before it enters the sprayed, condensing section. This avoids the precipitation of scale deposits. Also, in the gas line, between the precooler and the condensing coil is located the Niagara "Oil-Out." At this point the oil vapor is condensed and is easily removed from the refrigerant.

The unit is compact, measuring approximately 8½ ft x 14 ft and 16 ft in height. It weighs approximately 13 tons.

install
peak performance
into your
compressors (AIR · GAS · AMMONIA)

J. H. H. VOSS VALVES
REG. U.S. PAT. OFF.

Peak performance, maximum efficiency, greater output, and lower power costs can be built into your oldest, and of course your newest, compressors by the installation of VOSS VALVES.

Check THESE VOSS VALVE ADVANTAGES:

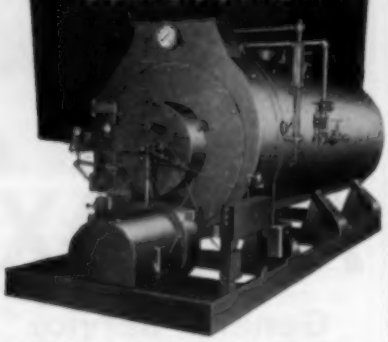
✔ Quiet, vibration-free operation ✔ 20 to 60% more valve area ✔ less power consumption ✔ minimum pressure loss ✔ normal discharge temperature ✔ lower operating costs ✔ utmost safety

Our detailed proposal for increasing the efficiency of your compressor will be sent you without obligation. Send us the name, bore, stroke, and speed of your machine.

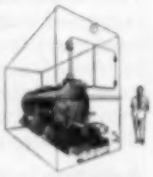
VOSS VALVES / J. H. H. VOSS Co., Inc. 784 East 144th Street, New York 54, N. Y.

STREAMLINED INSTALLATION

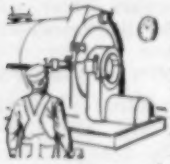
SAVES { SPACE COSTS TIME with CYCLOTHERM CYCLONIC COMBUSTION



Cyclotherm Steam and Hot Water Generators
18 to 500 hp.
15 to 200 psi.



Cyclotherm Cyclonic Combustion enables Cyclotherm to be as much as ⅓ smaller than other packaged units. More space is freed for productive use. Cyclotherm requires minimum boiler room space. Can be placed in working area. Cyclotherm arrives completely assembled and factory tested . . . needing only 5 connections for installation.



Cyclotherm servicemen will assure efficient, economical operation by instructing your personnel. Are available at any hour ...any day. Cyclotherm guarantees a minimum 80% efficiency in oil and/or gas. Maintenance savings amount to as much as 50%.

For complete details as to how you can produce steam at lowest costs, write today for Cyclotherm's free booklet.

YEARS AHEAD IN STEAM GENERATION

CYCLOTHERM

Steam & Hot Water Generators

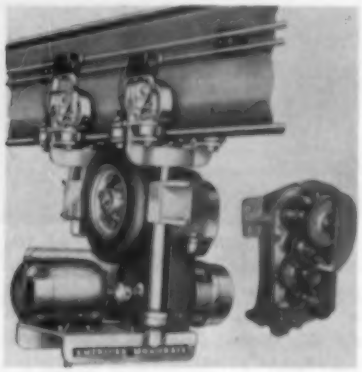
Cyclotherm Division
National-U. S. Radiator Corp.,
2222 E. First Street,
Oswego, New York

new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

New MonoRail Drive Unit

F-9 The AMERICAN MONORAIL Co., 13107 Athens Ave., Cleveland 7, Ohio, offers a new precision built drive unit to propel a hoist or other type carrier on monorail track or crane bridge.



Traction is obtained by spring-loaded contact of the rubber wheel against the bottom of any smooth flange track. The new unit features duti-rated, lift-time helical gearing; speed range from 35 to 350 fpm; power range from ¼ to 2 hp; can use any standard NEMA frame motor; can apply any type motor brake; automatic adjustment for tire wear; available with fluid drive for cushioned start, and operates on any smooth flat flange track.

It meets all the requirements for constant service, exact delivery cycles, grade travel or the movement of loads up to 5-tons with power consumption and maintenance held to a minimum.

Electric Heating of Lines

F-10 PREFERRED UTILITIES MFG. CORP., 1860 Broadway, New York 23, N. Y., has developed a convenient and inexpensive means for electric heating of suction lines carrying residual (No. 6) oil from the fuel tank to the pump and heater. Its purpose is to keep the oil in the lines at pumpable temperature, especially during burner shutdowns or out-of-service periods, by making up the radiation, convection or conduction losses from the piping.

This new product, known as "Preferred Ribbon Heat," is a low temperature lineal heater in the form of flexible tape, ½ in. wide and 1/10 in. thick, of special fusible alloy resistance wires, suitably braided, insulated

BEFORE

AFTER descaling with Oakite Compound No. 32

DON'T ROD OUT SCALE

—Dissolve It!

OAKITE COMPOUND No. 32 did all the work on this pipe—did it better, faster, far more safely than any mechanical method.

Oakite Compound No. 32 *dissolves* scale and rust as it circulates—often makes dismantling of equipment unnecessary. Removes *all* deposits —flows into areas inaccessible to rod and drill. Does not affect sound metal surfaces—does not change dimensions of tubes and piping.

Use Oakite Compound No. 32 to descale and derust

condensers	heaters
compressors	brine coolers

FREE HANDBOOK 4305 tells all about it. Ask your local Oakite Technical Service Representative. Or write Oakite Products, Inc., 20A Rector St., New York 6, N. Y.

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OAKITE

MATERIALS · METHODS · SERVICE

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A firing system that's inadequate and expensive may be eating into your profits . . . unnecessarily! Convert to gas—and increase profits—by cutting labor costs, eliminating coal hauling, ash-removal, flue and tube cleaning. Gas requires less maintenance on equipment, increases efficiency, and effects greater savings! Present system can usually be retained as a stand-by.

Consult McBurney Stoker and Equipment Company, makers or suppliers of the best boiler room equipment available, on all problems. If your firing system requires wood, coal, gas, oil, or any combination thereof, McBurney Stoker and Equipment Company has designed-units to fit your particular needs. They have served industry since 1911, and can offer you the finest equipment, including: Copes-Vulcan Boiler Controls, Copes Feedwater Regulators, Vulcan Soot Blowers, McBurney Underfeed Coal Stokers, Aqua Electric Scale Control, Gas and Oil Burning Equipment.

McBURNEY
STOKER AND EQUIPMENT COMPANY

SINCE 1911

2110 Peachtree Road, N.E.
Atlanta, Georgia

Phone Elgin 4436

new equipment (continued)

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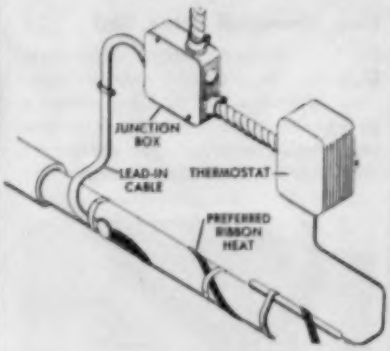

and protected for continuous use under all service conditions.

The tape is easily spiralled in any required length directly around the suction piping. It can be applied at any time during the new installation or readily added to an existing oil piping system. The end of the heating tape is attached by a waterproof connection to a 3-ft non-metallic sheathed cable, thence to the electric supply. A thermostatic sensitive bulb, strapped against the pipe, leads to a thermostatic control. The cable is directly connected into any standard electric outlet box.

The use of Preferred Ribbon Heat is based on maintaining a pipe line temperature at either 100 F or 120 F. The selection of the required unit length depends upon the voltage and the heat loss from the pipe surface and through the pipe line insulation, with the electric current input always thermostatically controlled.

Condenser Tube Cleaner

F-11 THOMAS C. WILSON, INC., 21-11 44th Ave., Long Island City 1, N. Y., has announced a new electrically driven cleaner for air conditioning condenser tubes ⅝ in. to ¾ in. O.D.

Called the AB Tube Cleaner, it is designed for simplicity of operation in the rapid removal of algae, slime and mud deposits, to reduce condenser head pressure.

Equipped with a carrying handle and built-in base, the AB Cleaner is lightweight and portable. It is powered by a ¼ hp 3450 rpm motor available in 110-220 volts a-c, single phase only.

Several types and lengths of flexible shafts and metallic casings are available for various tube sizes. The assembly is readily attached to the motor by means of a grooved spline connection.

One packing for many uses

ALLPAX

Reg. U.S. Pat. Off.

General Service Packing

This universal packing fills a wide variety of needs. Remains dry to the touch, and its special lubricant can't be forced out. Stays resilient, and forms a glassy non-friction surface. Provides a tight seal without excessive pressure or danger of scoring.

Available in two styles:

Style No. 1. (Under 600°F.)
For use on centrifugal and rotary pumps, valve stems, etc. Recommended for use against steam, water, air, ammonia, gases, oils, distillates, etc.

Style No. 2. (600°F. to 1200°F.)
This style is recommended for centrifugal and rotary pumps, valve stems and expansion joints—against steam, water, air dowtherm, etc. *Contains a heat-proof lubricant.*

New Catalog
Describes complete line of Allpax packings, including those for special service.

Write for your copy TODAY:

THE ALLPAX COMPANY, INC.
Mamaroneck, N. Y.

new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

Water Separator Snubbers

F-12 BURGESS - MANNING COMPANY, Libertyville, Ill., and Dallas, Texas, manufacturers of industrial noise abating equipment, have announced a new device that simultaneously performs the twin functions of water separation and noise reduction.

The device, known as the Burgess-Manning WSS Water Separator Snubber, answers a need for an instrument that effectively extracts 100% of water from water-sealed vacuum pump exhausts and simultaneously reduces the noise of the gas discharge to ear-comfort level.

Both water and air enter the side of the Separator Snubber and are separated centrifugally within the unit. The water-free air is then discharged at the top of the snubber and water leaves the unit at the bottom. The device allows for handling of water having a percentage of settlings and other impurities, and can be cleaned conveniently when necessary.

Standard models range from 6 to 26 in. diameter and weigh from 8 to 415 lb and handle from 60 to 4,700 cfm.

Gate Valves

F-13 THE FAIRBANKS COMPANY, 393 Lafayette St., New York 3, N. Y., has introduced new Union Bonnet, Rising Stem, gate valves in the 125 lb and 150 lb steam working pressure classes, to replace solid and split wedge rising stem screwed bonnet valves, with same pressure ratings.

The Fairbanks two piece Radial Seat Union Bonnet is the outstanding construction feature of the new valves. The Radial Seat is an accurately machined true ball and socket joint insuring a tight body bonnet connection and perfect alignment of working parts. The two piece construction eliminates sliding or scraping—scoring—of the mating body and bonnet surfaces during assembly and disassembly and provides even contact pressure over the mating surfaces. The heavy union nut will not deform under pressure and it protects the body and the bonnet from distortion and wrench abuse. The new valves may be repacked under pressure when wide open and the top seat is located above the stem threads, out of the line of flow, protected against deposits and excessive wear.

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Compression Grip distributes strain over whole plate area

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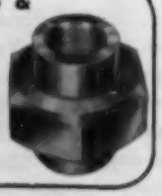

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WHAT'S NEW Where to Get It

Circle code number on page 17 or 18

R-1 **MOLY SPRAY COATING**—Bulletin 102, 2 pages—Describes in detail "Moly-Spray-Kote," a carefully compounded dispersion of micro-fine molybdenum disulfide in a self-pressurized aerosol type sprayer to provide a dry lubricating film for industrial applications.—THE ALPHA CORPORATION, 65 Harvard Ave., Stamford, Conn.

R-2 **RUBBER INSULATED CABLES**—Bulletin 1090, 36 pages — Covers rubber insulated "Loxarmor" cable constructions, a cost-saving cable design for use in racks or trays for applications where rigid conduit systems are not required. Current carrying capacities, dimensions, installation and handling techniques, drawings and instructions are included.—THE OKONITE COMPANY, Passaic, N. J.

R-3 **COOLING TOWER PUMPS**—Bulletin No. GR-155, 4 pages—Six-step manual for sizing cooling tower pumps and piping discusses amount of water to be circulated to tower; layout of piping system; static head and pressure drop; pump selection; and other pertinent data, with selection charts.—BELL & GOSSETT COMPANY, Morton Grove, Ill.

R-4 **JET PUMP**—Data Sheet Ea, 4 pages —Design, construction, installation and operation of the A-S-H Hydro-Ejector, a jet pump designed to pump a mixture of solids through a transporting pipeline. Photographs, line drawings and cut-away views illustrate application to hydraulic materials handling systems. — ALLEN - SHERMAN - HOFF CO., 259 E. Lancaster Ave., Wynnewood, Pa.

R-5 **BRONZE GLOBE VALVE**—Circular 602, 4 pages—Describes the LQ600 bronze globe valve featuring "Brinalloy" seat and disc for maximum resistance to wear and corrosion in a wide variety of industrial uses. Cut-away views give parts identification and explain construction.—THE LUNKENHEIMER COMPANY, Box 360, Annex Station, Cincinnati 14, Ohio.

R-6 **PIPE FITTINGS**—Bulletin S-3-55, 4 pages — Describes new 150 lb stainless steel pipe fittings including 90° and 45° elbows, tees, crosses, couplings, reducers, pipe caps, unions, plugs, and bushings. Gives specifications for sizes ⅛" to 2" in both screw-end and socket-welding types. —WATSON-STILLMAN FITTINGS DIVISION, H. K. PORTER COMPANY, INC., P. O. Box 95, Roselle, N. J.

R-7 **UNIT SUBSTATIONS**—Bulletin No. 102, 16 pages—Explains how compact, enclosureless packaged power at load centers effects installation and operating economies while stepping-up production and providing for future load demands. Illustrates and describes typical applications.—CONTINENTAL ELECTRIC EQUIPMENT COMPANY. Box 1055, Cincinnati 1, Ohio.

R-8 **MATERIALS HANDLING**—Bulletin AA, 8 pages—Gives complete details on uses, properties and advantages of double-U welded chain made from high alloy steels in material diameters up to 2", for handling critical loads up to 25,000 lb. Illustrated.—THE McKAY COMPANY, 1005 Liberty Ave., Pittsburgh 22, Pa.

R-9 **INDUSTRIAL LUBRICATION**—Lubrication Chart—Contains lubrication recommendations for such applications as hydraulic systems, spindles, air compressors, reduction gears, electric motors, oven conveyors and other general uses. Suitable for hanging on shop wall.—E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

R-10 **D-C MOTORS**—Bulletin No. C-2002, 12 pages—Explains how dynamic response is standard performance of new line of d-c motors. Includes speed ranges, acceleration rates, enclosures, dimensions, and selection data. Illustrated with photographs diagrams, charts, and sketches.—RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Road, Cleveland 19, Ohio.

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FIG. 215 Flanged

FIG. E-57 Double Window

FIG. 212 Visibility Welding Neck or Screw

FIG. E-811 Flapper

FIG. E-1810 Rotating Wheel Type

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R-12 **WASTE WATER RECLAMATION** —Technical Reprint T-129, 6 pages —Discusses the treatment of sewage plant effluent for water reuse in process and boiler feed. Typical plant layouts and result sheets are shown and discussed, along with cost factors, applications, and equipment. Bibliography included.—GRAVER WATER CONDITIONING CO., 216 W. 14th St., New York 11, N. Y.

R-13 **AIR TUBE SYSTEM** — Bulletin, 4 pages—Describes a newly developed prefabricated "Airtube" system for fast, efficient pneumatic tube connection of any two points up to 130 ft apart. Suggests arrangements for installation in any type of building. Lists all components furnished in the packaged unit.—LAMSON CORPORATION, Syracuse 1, N. Y.

R-14 **POWER TRANSFORMERS**—Bulletin "Esco Transformers," 4 pages—Covers load factored and motor-sized transformers for reducing distribution and power costs in the electrification of all field and pumping operations. Describes models available, gives engineering data and prices.—ELECTRICAL SERVICE COMPANY, P. O. Box 191, Greenville, Texas.

R-15 **WELDING FILLER METALS** — Chart—Keys by use full line of filler metals for welding, with each rod and electrode identified by metal for which it is suited, forms available, and methods used. Covers metal arc, submerged arc, tungsten electrode, metallic electrode, oxyacetylene, and atomic hydrogen methods.—THE ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

R-16 **REGULATING VALVES** — Bulletin 37R, 4 pages—Describes broad line of temperature and pressure actuated control and relief valves and governors for power, chemical process, petroleum and related industries, showing how advanced design makes effective use of alloys and packing materials.—ATLAS VALVE COMPANY, 280 South St., Newark 5, N. J.

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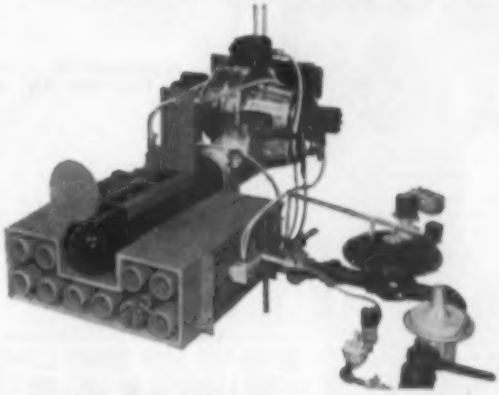

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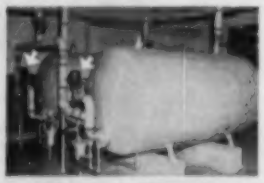

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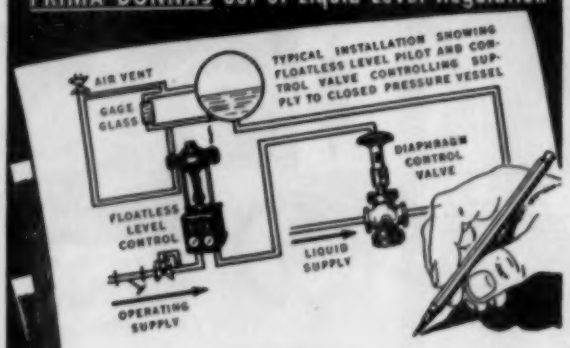
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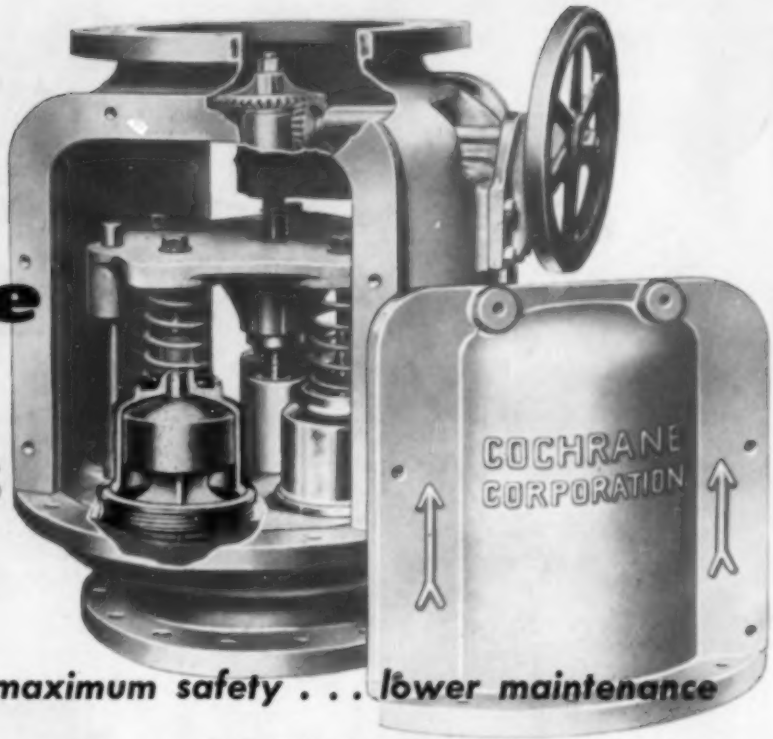

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